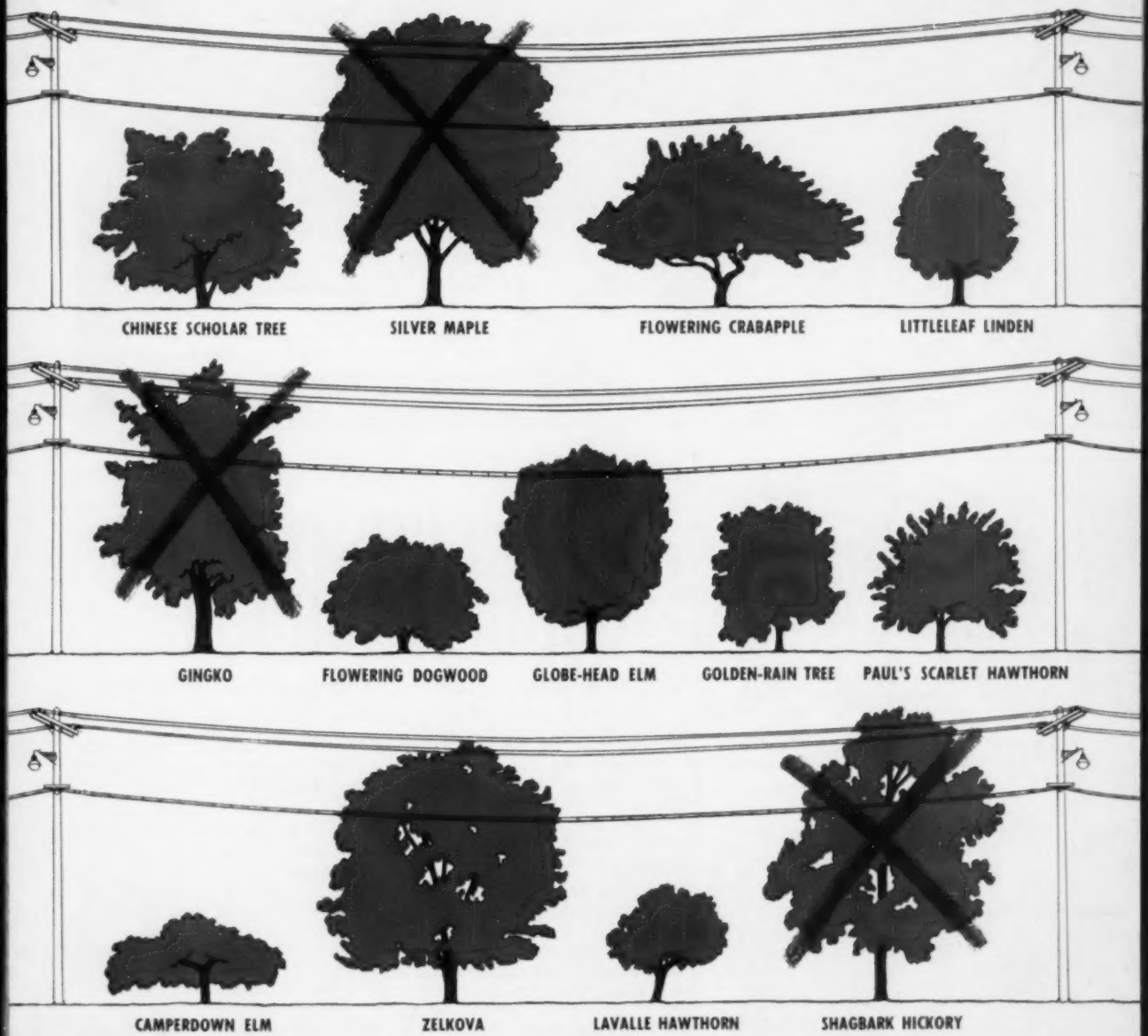
MAY 9, 1955

NEWS ISSUE

Electrical World

Price 35 Cents

A McGRAW-HILL PUBLICATION



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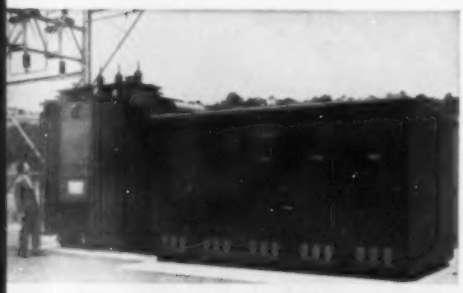
Repeat Requisitions Save Time and Effort . . . Page 48

E S POWER GS W 13
UNIVERSITY MICROFILMS IN
313 N 1 ST
ANN ARBOR MICH

LANDSCAPING PLANS are reviewed for G.E.'s new booklet by E. M. Hunter (left), Electric Utility Engineer; J. C. Page (right), Manager—Product Planning for Medium Voltage Switchgear Dept.; and artist John Watrous. The booklet shows planting arrangements which allow utilities to accommodate residential areas with inconspicuous unit substations.

INTELLIGENT PLANTING OF SHRUBS which blend with those of the community can keep substations almost completely out of sight, helping to preserve local good will.



LOW AND COMPACT DESIGN with full-length transition between transformer and switchgear makes this G-E unit substation particularly easy to landscape.

Landscaping can help utilities...

MAKE SUBSTATIONS GOOD NEIGHBORS

. . . The economical way to good distribution and healthy public relations

Distribution losses can be whittled substantially and systems costs reduced when unit substations are installed closer to the residential load. But, this obvious step in improving distribution involves a ticklish public relations problem.

COMMUNITY APPROVAL NEEDED

By making substations more attractive, or at least less conspicuous, system planners find that the substation can be socially acceptable—allowing utilities to take advantage of proximity to load and improve local good will.

LANDSCAPING COSTS LITTLE

Landscaping substations is far less expensive than housing. Even the problem of concealing steel structures can be solved if towers are low and if terrain is graded up to substation fences and evergreens are planted at the top.

HOW TO DO IT

To help you to economically serve increasing residential load and meet community approval, General Electric engineers are keeping substation designs clean and functional. And, G.E. has prepared a new booklet which shows how landscaping may be done attractively and at minimum cost.

To get your copy write for GED-2403 to the General Electric Company, Section 301-291, Schenectady 5, N. Y.

MORE POWER TO AMERICA

GENERAL ELECTRIC

Electrical World

Published for 81 years for those engaged in the business of generating, transmitting, distributing, or applying electric power

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COMING NEXT WEEK—Howard Seelye, Detroit Edison Co, answers the question, "Have Utilities Neglected Research?" in such a way that both "pro and con" advocates will find it thought provoking.

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EDITORIALS

A Co-op Man Speaks Out on Federal Power

Electric companies and the electric cooperatives have much in common. Both look on themselves as private enterprise ventures despite the fact that co-ops use government financing. Both face many of the same public relations problems.

One of the larger bones of contention between these two types of electric utilities has been their philosophy with regard to federal encroachment in the power field. Electric companies have bitterly fought it. Co-ops have been rather inclined to support federal expansion on the theory that it provided a source of cheap power. Such energy is welcomed by the great majority which buy all of their power requirements.

There have been signs for some years that many co-ops are tempering their stand as they find that federal power has many limitations that conflict with sound utility practice and local interests. Andrew L. Freeman, manager, Minnkota Power Cooperative, Inc, indicated the thinking of a number of co-ops on this issue in a recent speech before the Upper Midwest Power Forum held at Huron, S. D.

Speaking for himself and also the board of directors of the Minnkota generating and transmission co-op, Freeman told the forum:

"In so far as our own particular problems are concerned, we do not look with favor on or hold much hope for any action designed to put the federal government in the power business as the supplier of the electricity we need."

At another point, he said:

"We further feel that in view of the fact that the federal government has at no time either assumed or announced a policy of utility responsibility in connection with any hydro developments which it has undertaken heretofore, there is little reason it will be willing to do so at this time."

But Freeman's clincher came in this excerpt:

"It looks to us that if we expect and hope that the federal government is going to move in and solve our problems, we are in for not only disappointment but a continuous state of confusion and shortness of supply, for that has always been the case where federal power with all its uncertainties has entered an area."

It is fair to point out that Freeman's remarks were directed mainly at the idea of federally built thermal plants in the Missouri River Basin. However, the thoughts he expresses reflect a changing sentiment in sections of the country where large groups of people have in the past seen federal power as the elixir for changing their areas into utopias.

Note to the Young Engineer

A study now underway indicates that today's engineering graduate has about one chance in two of moving into management. During the last half century there has been a steadily increasing flow of engineers into positions of executive responsibility. John Bell Rae, associate professor of history at Massachusetts Institute of Technology, who is conducting the study believes the same trend is apparent in government although to a lesser degree.

In another study designed to pinpoint some of the engineer's difficulties in taking on management responsibility, it was found that the engineering executive is likely to have trouble in dealing with intangibles—such as human relations. Other difficulties named in this second study are slowness in making decisions, too specialized, likely to want to go it alone.

As the present engineering student has a 50-50 chance of moving into management, he will do well to try to attain a broader education than he would ordinarily get in a strictly engineering school. More important, once he has been hired, he should pay great attention to the methods and attitudes of successful bosses in his company. The young engineer must prepare for the management position that is likely to come his way. Otherwise he may wait in vain.

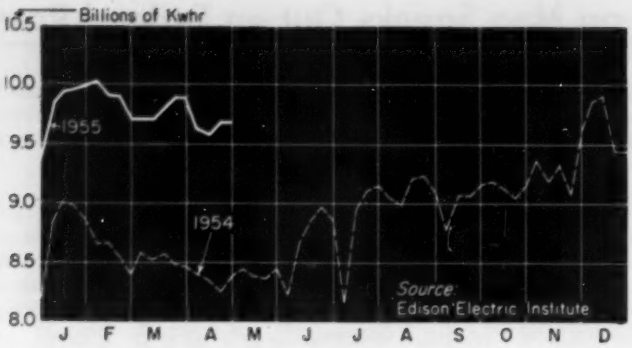
Repeat Requisitions

The repeat requisition (p 48), used in re-ordering material of the same type, is an established procedure in electric utility purchasing. The variable in the procedure is the make-up of the requisition form. The procedure is important enough to rate a place on the program of the Edison Electric Institute's Purchasing and Stores Committee meeting in Birmingham this week.

The objective in preparing a repeat requisition form is to get all pertinent information in easily accessible order. Too brief a form fails to accomplish this. An extended form adds unnecessary red tape and may require more time for handling than is saved by the repeat requisition procedure.

In presenting the advantages of the form used by Duquesne Light Co, we believe we have chosen one well adapted to many utility operations. A study of this may reveal that with minor changes it could be used to an advantage by many other companies.

THE ELECTRICAL WEEK



OUTPUT

Week Ended Apr. 30

9,699,000,000 Kwhr

Up 15.6%

Atomic Energy Commission requirements (estimated by Electrical World) . . . 713,000,000 kwhr. Excluding AEC, output increase was 11.3%

Per Cent Change from Previous Year

	Total US	New Eng.	Mid. Atlan.	Cent. Ind.	West Cent.	South-east	South Cent.	Rocky Mount.	Pacific NW	Pacific SW
Apr. 30	+13.6	+12.7	+9.7	+20.0	+5.0	+22.6	+10.5	+7.6	+13.0	+12.3
Apr. 23	+17.4	+11.2	+10.6	+21.1	+6.4	+26.4	+14.9	+8.4	+16.6	+12.2
Apr. 16	+13.1	+8.5	+7.4	+18.9	+4.9	+23.3	+4.7	+8.5	+14.3	+19.0

Seasonally Adjusted Index 192.1 Week Ago 191.3 Year Ago 166.7

The Issue's News Highlights . . . Private low-dam vs federal high-dam controversy flares anew as hearings on Hell's Canyon issue begin in Senate Interior Committee . . . Utilities lose legal round in federal appeals court which rules that they have no standing to sue in case charging co-op contracts with SPA, REA create unfair competition . . . First REA generation-transmission loan to be granted under Republican administration is awarded to Colorado co-op.

Rate Changes: Virginia Supreme Court of Appeals has affirmed the 1953 decision of the State Corporation Commission to grant a $4.8 million a year rate increase to Virginia E&P . . . Arkansas P&L has asked PSC for approval to amend its existing fuel clause in electric rates. This will permit applying increased price of gas which company burns under its boilers. Requested amendment would include service to co-ops which in past have been exempt from adjustments based on fuel prices.

American Public Power Association met for its annual convention last week in Florida and heard speakers going after their favorite whipping boys. Dixon-Yates, partnership, preference qualifications, destruction of the so-called yardstick, all received the treatment customary at such meetings. A resolution also called for Congressional investigation of "propaganda, lobbying, and political activities" of private utilities, and legislation prohibiting use of revenues for these purposes. But no mention was made of such activities by public power forces. Rep Chet Holifield (D-Calif.) even found fault with Consolidated Edison of New York's proposal to build a nuclear power plant without government financial aid: "If this project is approved, the electricity customers of Consolidated Edison will find their rates increased to finance the atomic experiment."

Commonwealth Edison's Public Service Co Division has bought municipal electric system of the village of Hinsdale for $1.4 million . . . Virginia E&P has offered to pay city of Harrisonburg $2.5 million for its municipal electric system.

Bonneville Power Administration at end of last month was able to step up deliveries to 95% of normal interruptible energy demand to 14 industrial customers whose service had been curtailed earlier. This resulted from improved water conditions. In another action, BPA announced it planned to reconstitute the Pacific Northwest Regional Advisory Council to advise on power problems in the region . . . Chelan County (Washington) PUD's seven-year fight to acquire the Chelan facilities of Washington WP by condemnation enters another phase June 10 when Chelan County Superior Court will begin trial on value of properties.

NEWS OF THE INDUSTRY BRIEFLY TOLD

Off the Washington Wire . . . Senate has approved nomination of William R. Connole to Federal Power Commission. He will succeed Nelson Lee Smith whose term expires in June. Smith served with FPC for 12 years . . . FPC has issued final order to Pacific G&E approving construction of its $73 million Kings River, Calif., power project. The four-dam project will develop 240,000 kw.

TVA built 2,700 miles of rural power lines in its area in 1954, bringing total to 104,000 miles. Electrified farms increased a little over 1% during year to bring electrified farms to 93% of all farms in valley, TVA reports . . . Memphis Light Gas & Water Commission is considering Gordon Clapp, former TVA chairman, for position as vice president to replace Sam Pharr, who was dismissed recently. Clapp, now deputy city administrator for New York City, would then be in line to take over from Major Thomas Allen, president of the commission who plans to retire before long.

Finance: SEC has postponed until June 6 a hearing on Mississippi Valley Generating's $120 million debt financing proposal which had been scheduled for hearing May 16 . . . Iowa Public Service will pay June 1 a quarterly common stock dividend of 20¢ a share versus 17½¢ previously . . . Kansas G&E has asked FPC for approval to issue 975,000 shares of no par value common stock to carry out 2-for-1 stock split.

EEI's Transmission and Distribution Committee has awarded a testamentary scroll to Howard P. Seelye, Detroit Edison's manager of engineering, in recognition of his achievements as engineer, leader, and friend . . . EEI is sending to member companies an analysis of Supplement No. 2 to "Schedule for Rating Electric Generating Stations." It deals with changes in schedule made following discussions between EEI and Central Traction & Lighting Bureau.

Quebec Hydro announces it is supplying "demand" meters to users of large quantities of electricity in private homes. Consumers requiring demand meters (homes using minimum of 1,000 kwhr a month) are said to amount to 2% of all consumers.

Utah P&L has received PSC approval to build $2 million 69 kv and 138 kv transmission lines into state's uranium country. Approval was made despite opposition from number of Colorado co-ops which serve that section.

ABOUT PEOPLE IN THE INDUSTRY

Public utility advertising "has grown increasingly important each year and today is considered a vital and significant part of utilities' operations," Fred Westin, president, PUAA, told EW as PUAA prepared for its annual convention this week. "Advertising provides the utility with a voice to speak to the public, including customers and stockholders; to tell the community of its work, problems, and its accomplishments. It helps to sell appliances and thus improve load, and without it utilities would be severely handicapped," Westin added.

To keep pace with growing demand for power in TVA area every year, not counting federal defense plant needs, will require addition of 750,000 kw a year, or investment of $150 million a year, according to Dr R. R. Paty, TVA director. TVA can supply half of this money from its power earnings, he says in discussion of plans to finance future TVA power expansion, but, he adds, "something more than $75 million of outside capital will be needed annually to finance construction of new facilities."

More News About People page 36

DOUGLAS McKAY

Hells Canyon Hearings

- **Senate Interior Unit hearings review technical aspects**
- **No Congressional action seen before summer adjournment**
- **Interior Secretary McKay opposes federal high-dam plan**

The controversial Hells Canyon issue was before Congress again last week. The Senate Interior Committee which held three days of grassroots hearings in the field early in April followed them up with hearings in Washington.

The hearings had little or no grassroots flavor, with testimony restricted to technical information from governmental agencies and to testimony pro and con from organizations interested in the proposed legislation.

Action: Doubtful this Session

As the hearings progressed, it became doubtful whether any legislation authorizing a federal high dam on the Snake River would be forthcoming this session. About the only certain result of the hearings will be a report of the committee.

Although some 30 senators are backing a high dam bill introduced by Sen Wayne Morse (D-Ore.), it seems almost certain the dam will not be authorized at this session. The question is how far the bill can go or how far its sponsors are interested in pushing it.

Some opponents of the measure, such as Sen Henry Dworshak (R-Idaho), have charged that sponsors like Morse are not interested in legislation this year but prefer to keep it for a campaign issue for 1956.

In a communication to Sen James Murray, Interior Committee chairman, Federal Power Commission Chairman Jerome K. Kuykendall pointed out that the commission may be presented with an examiner's recommendation before Congress quits around Aug. 1. But it will be impossible for the commission to review and act on the examiner's recommendations until late in the year, he stated.

The first day of the three-day hearings was devoted to technical information from government agencies: the Bureau of Reclamation, the Army Corps of Engineers, and the Bonneville Power Administration. The other two days were reserved for proponents and opponents.

Earlier the committee had heard from four House members, all of whom have introduced high dam bills: Reps Gracie Pfost (D-Idaho), Edith Green (D-Ore.), Lee Metcalf (D-Mont.), and Don Magnuson (D-Wash.).

Secretary of the Interior Douglas McKay opposed the high dam legislation in a departmental report sent to the committee. McKay pointed out that the FPC has under consideration the applications of Idaho Power Co to construct three dams in the Hells Canyon reach of the Snake River.

McKay did not endorse Idaho Power's three-dam plan, but he wrote:

"We are firmly convinced that where a non-federal proposal can provide results which, in terms of comprehensive development, are reasonably comparable with those anticipated from a federal project, the people of the region should be encouraged to utilize, in every proper way, the available capacities of public or private organizations for doing the job on a non-federal basis under conditions fully protecting the public interest."

High Dam: Pro and Con

The Tuesday session was devoted to proponents of the legislation. The Interior Committee heard the American Federation of Labor and the Congress of Industrial Organizations, Rural Electrification Association groups, co-operatives, and the Farmers Union Central Exchange of St. Paul.

Charles A. Robinson, Jr, staff engineer of the National Rural Electric Co-operative Association, said, "It is our opinion that the federal project will provide significantly more prime capability and more average annual energy than the (Idaho Power) Company plan."

On Wednesday, Fred M. Cooper, president of the Idaho State Reclamation Association, led off for the opponents. He asserted that the majority of Idaho farmers are against the federal project.

"The Hell's Canyon issue has been thoroughly aired in all its ramifications," Cooper said. "One would anticipate a sharp division of opinion for one reason or another among the people who till the soil. Yet to my knowledge, there is not a single irrigation district or canal company in

Customer Won't Wait

Central Farmers Fertilizer Co, representing 16 of the largest producer co-ops in the Midwest, has dropped plans to power its proposed elemental phosphorus furnace at Georgetown Canyon, Idaho, with energy from the controversial Hells Canyon high dam.

Instead, the company is conducting "satisfactory" negotiations with Utah Power & Light Co for sufficient energy to supply a 35,000 kva furnace costing $5 million. As a result of these negotiations, the company is preparing to start design work on the furnace.

Idaho that has ever gone on record in favor of a federal Hell's Canyon Dam.

"There is not a major statewide farm organization in favor of it. The Granges and Farm Bureau groups in the affected area have taken firm stands against it in overwhelming numbers."

J. H. Silbaugh, president of the North Side Canal Co, based his opposition to the project on a belief that it threatened existing water rights.

"We feel" he said, "that the federal Hell's Canyon Dam, if constructed, would be a definite threat, not only to future development, but also to existing water rights. We are very much concerned regarding our existing rights because of the position the federal government has taken that private appropriators can acquire no water rights on navigable streams. And we do not believe that any protective language can be placed in any bill that can protect us in the future."

John Tate, Boise, Idaho, commissioner of Ada County Drainage District No 3., testified that the Boise Valley has a serious drainage problem.

"On the Mountain Home Desert we need water for irrigation," he said. "The two problems in these adjoining areas are closely related, and solving the Boise Valley drainage problem can be the means for reclaiming the Mountain Home land."

Sloan Plan: Best for Irrigation

The Sloan plan, a reclamation and drainage proposal under study by the Bureau of Reclamation, is the best subsidy-free irrigation plan remaining in the entire nation, Tate said. It has the undivided support of irrigation groups from both the Mountain Home and Boise areas, he added.

So, he said, it isn't necessary to have the costly Hell's Canyon Dam constructed in order to provide reclamation of the Mountain Home area.

As EW went to press, others to be heard from included N. V. Sharp, director in the National Reclamation Association; Alex O. Coleman, St. Anthony, a director of the Idaho State Reclamation Association; William Holden of Idaho Falls, a lawyer representing irrigation districts; Glen Sloan, a former engineer of the Reclamation Bureau; and R. P. Parry, counsel for the Idaho Power Co, who handled the company's case before the Federal Power Commission.

Utilities Can't Sue . . .

. . . is federal appeals court ruling on suit charging co-op contracts with REA, SPA create unfair competition

Kansas City Power & Light Co and other private utilities fighting the legality of a batch of contracts entered into by a group of five federated cooperatives, the Southwestern Power Administration, and Rural Electrification Administration have lost another round in federal court.

U. S. Court of Appeals in Washington, D. C., ruled 2-1 that the utilities have "no standing to sue" the government and ordered the case dismissed. The issue in the case was whether the Kansas, Missouri, and Arkansas utilities, which claimed they were in competition with a federally supported power program, could challenge the validity of that program in the courts.

The utilities sought to block Department of Interior Secretary Douglas McKay and other government officials of SPA and REA from carrying out contracts with the co-ops to build a generating plant and transmission lines that would furnish electricity in areas served by private utilities.

Judge George T. Washington ruled for the majority that past supreme court decisions barred the utilities from arguing that their rights would be violated because competition resulting from contractural arrangements of federal agencies could not be unlawful.

Judge E. Barrett Prettyman, dissenting, said the contracts did not merely set up federal competition. He explained that because SPA intended to supply electricity to all the customers of the utilities, the contracts "allegedly would take all this business away from the companies and give it to the government."

The utilities had appealed from a district court decision which had favored the government after a trial.

Dixon, Gardner Inspect Plant Site

On-the-spot inspection of plans for the controversial Dixon-Yates plant at West Memphis, Ark., was made recently by E. H. Dixon (left), president of Middle South Utilities, Inc, and F. C. Gardner, president of Ebasco Services, Inc. They are shown above at the proposed site shortly after the Atomic Energy Commission had named Ebasco to supervise project construction.

Dixon commented, "We have a contract. We have signed agreements with the banks who will give us the money. We have been approved by the AEC. And we are ready to start construction very soon." Securities and Exchange Commission hearings, set for June 6, on $120 million debt financing scheme for the plant were just a formality, Dixon said.

Indiana Co-op Pays Off REA Loan

Boone County Rural Electric Membership Corp of Lebanon, Ind., recently presented the Rural Electrification Administration an $18,543.49 check for final payment on the co-operative's $567,926 REA loan.

Examining the co-op's check above are (l to r) U. S. Senator Homer S. Capehart (R-Ind.); Paul Morton, president of the co-operative; Ancher Nelsen, REA administrator; and Vice President Richard Nixon.

With presentation of final payment, Boone County REMC became the third and largest REA-financed co-operative to repay the government through earnings from farm service. Final payment was not due until July 1956.

Utility Commission Engineers Confer

Some 50 engineers and public utility commissioners met in Atlanta, Ga., late last month for the 33rd Annual Conference of Utility Commission Engineers. They examined some of the problems common to utility and public service commissions throughout the United States and Canada.

Conference members heard papers presented on the value of laboratory research to electric utilities, problems of urban mass transportation-communications under disaster conditions, and listened to a panel discussion of a problem now receiving lots of attention from utility companies throughout the country—use of depreciation accounting methods permitted under the Revenue Act of 1954.

New officers elected for the 1955-56 period were: R. E. Purucker, assistant chief engineer of the Wisconsin Public Service Commission, to succeed L. M. Keever of the North Carolina Commission as president; R. B. Thomas, chief engineer of the Illinois Commission, vice president; and R. L. Lloyd, of the National Bureau of Standards, Washington, who was renamed secretary to the conference.

A highlight of the three-day conference was a paper presented by Stanley Stokes, vice president of Union Electric Co of Missouri which is associated with the Nuclear Power Group.

Stokes pointed out that while much talk has centered around the development of nuclear power plants for electric utilities, practical, economic achievement is yet to be made.

"It should be borne in mind that the only full-scale reactors in regular service are those at Hanford, Wash., which operate at temperatures far too low to make power, plus the very special and costly plant powering the submarine Nautilus," said Stokes.

There are several small experimental reactors which have successfully produced steam to drive conventional turbines, he added, but "no pertinent information as to the cost of nuclear power for commercial purposes can be obtained from these plants."

The bright spot in the nuclear power picture, according to Stokes, is the breeder reactor at the National Reactor Testing Station, Arco, Idaho.

The group voted to meet in Chicago next year.

REA G&T Loan . . .

. . . to Colorado Co-op is first such loan under GOP; it will finance 16,500-kw plant.

The first generation and transmission loan to a new cooperative under the Republicans (EW, May 2, p 41) is a $3.5 million arrangement under which Southern Colorado Power Co will build and operate a 16,500-kw steam plant and carry much of its power through its own system to the Arkansas Valley G&T, Inc, the Rural Electrification Administration borrower.

The 40-year agreement between the co-op and the company is an example of the partnership approach REA Administrator Ancher Nelsen has been trying to sell since he took office. Under the contract, the co-op expects to get its power at a cost about 22% below existing wholesale rates in the area, and the company expects to have additional backup power available.

The loan is also the first of three which have been pending for some time in the Colorado area. Tri-State Generation and Transmission Association, a 24-borrower group in Colorado, Wyoming, and Nebraska, has applied for the same type of "integration" loan, but for the present its needs will be handled by the Bureau of Reclamation.

The Colorado-UTE Electric Association has submitted a loan application which is just about processed. When this is approved, the co-op will sign an agreement with the Western Colorado Power Co.

Law Change Sought . . . To make these loans Nelsen thought he had to get a change in the law. The REA Act provides that at least 50% of each year's loan authorization be earmarked for distribution in less-electrified states, on the basis of their percentage of unconnected farms to the national total. And rural Colorado is highly-electrified. Nelsen has asked Congress to repeal this section, and a Senate committee has already approved his suggestion. A House subcommittee has also gone along with the change, but the full committee has not yet acted.

Whether or not the postponement of the Tri-State application will leave the change in the law hanging fire is not yet known.

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COMPANY _____

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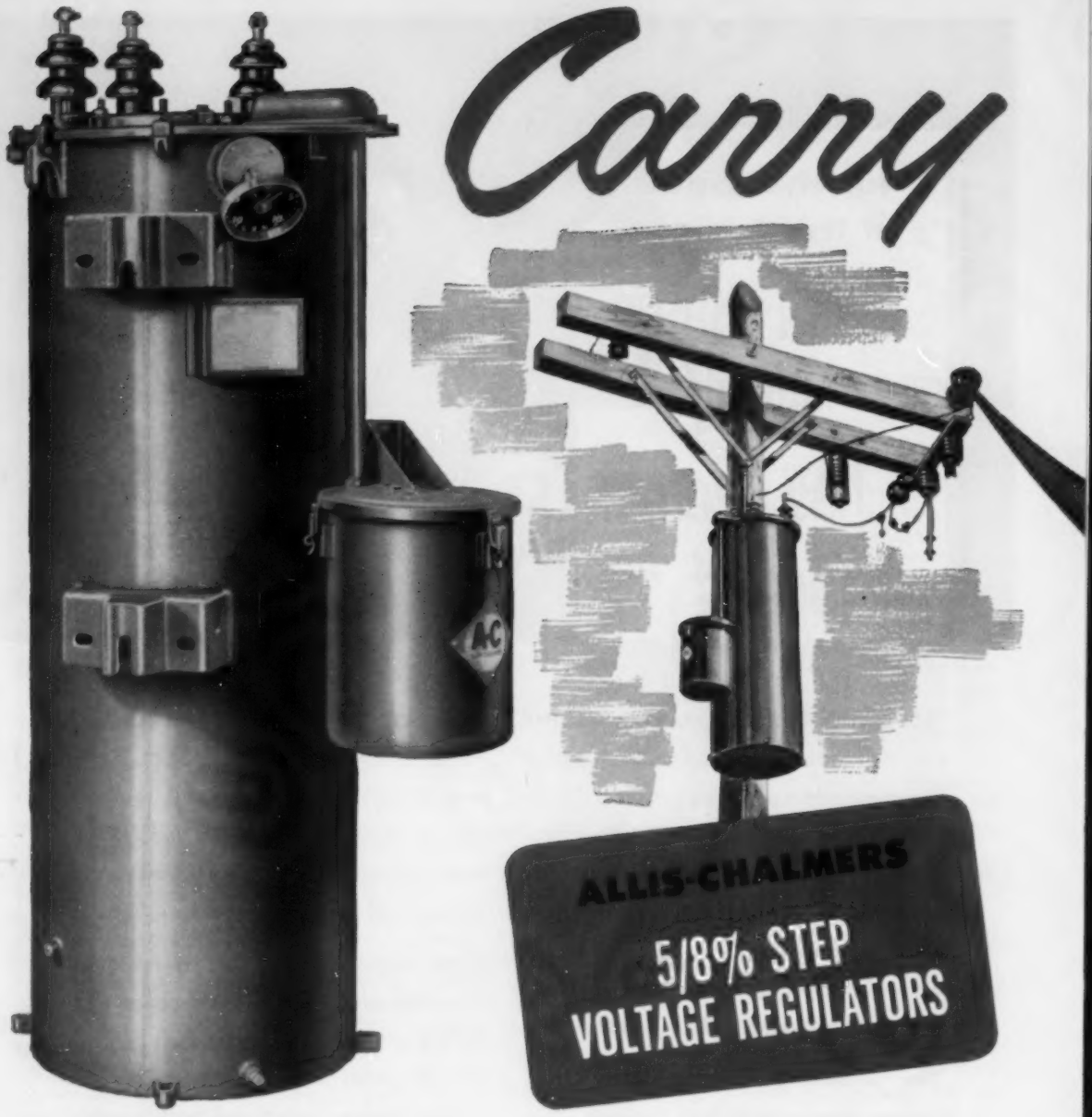

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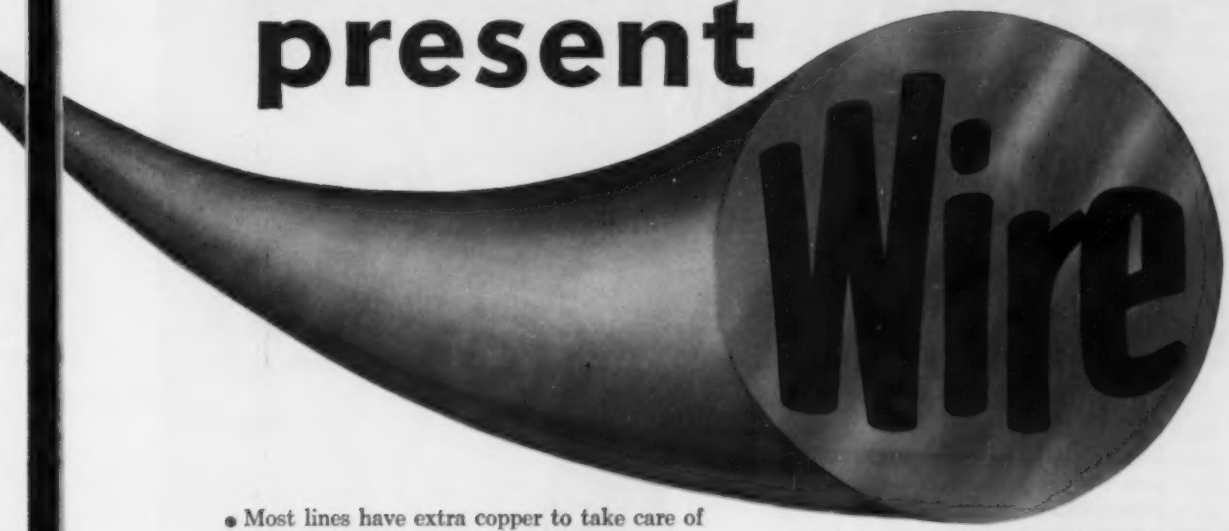
You get a time-tested mechanism in Allis-Chalmers distribution regulators. For more than twenty years, in thousands of applications, this mechanism design has proved itself as the most efficient means of changing taps under load. Laboratory tests show it can withstand over 5 million operations — equivalent to more than a century of operation.

Long-Life Contacts

An important reason why you get satisfactory regulation with a minimum of trouble from A-C distribution regulators is their long-life contacts. Made of arc-resisting materials, contacts are of large size. Laboratory tests prove that they can stand up under the equivalent of forty years of normal operation.

ALLIS-

double loads with present Wire



• Most lines have extra copper to take care of voltage drop. This provision isn't needed when Allis-Chalmers distribution regulators control voltage automatically. Here's why:

Doubling loads also doubles voltage drop. On a line with 10% voltage drop, for example, doubling the load makes the voltage drop 20%. You can retain the 100% increase in load to serve more customers while bringing the voltage drop back to 10% with an Allis-Chalmers regulator. Its ± 10% range makes increasing loads easy.

All the equipment you buy is Allis-Chalmers distribution regulators. No wire to buy, no expensive labor charges. And at the same time you get close voltage control, which gives you higher revenue, cuts voltage complaints.

Get all the facts on Allis-Chalmers distribution regulators. Call your nearby A-C district office or write Allis-Chalmers, Milwaukee 1, Wis.

Unit Construction

You get assurance of years of satisfactory service from A-C distribution regulators, as a result of unit construction. All connections are made and thoroughly inspected before tanking — assuring top-quality workmanship. Same feature makes untanking easy: core, coils, cover, and control form a single unit.

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You don't need highly trained servicemen to handle Allis-Chalmers distribution regulators. Take the control, for example. It is simple. Knobs are calibrated and easy to adjust. If needed, you can remove and replace the entire control merely by pulling a single jack plug — there are no other connections to break.

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Cooling Load Needs Complement

House heating is obvious and natural means of balancing seasonal load factors, and utility economics favor the heat pump over resistance heating

CONSTANTINE W. BARY, Economic Analysis Engineer, Philadelphia Electric Co, Philadelphia, Pa.

The electric utility industry is now squarely faced with finding a proper solution to the economics of residential load. This problem has been brought into sharp focus by residential air conditioning which is rapidly engulfing many of the country's electric supply systems.

This article examines the basic physical and economic factors and considerations which require evaluation in determining the economics of year-round residential air conditioning load. It also demonstrates their application to a large metropolitan system in the eastern United States. Results obtained for that system will differ in details from those derived for other systems. But certain general concepts underlying such evaluations are so fundamental that they will be pertinent and useful to others in their broader aspects.

Problem Summarized . . . To simplify the basic broad considerations in the determination of the economics of the year-round residential air conditioning load several assumptions are made. It is assumed that the end-blocks of residential rates, averaging close to 2¢ per kwhr in cities of 500,000 east of the Mississippi, are compensatory for all additional uncontrolled energy uses, by residential customers when such uses provide an annual diversified load factor of 45%.

On this basis, the following observations are made:

1. Summer residential air conditioning load can be economically acquired by the utility at such a rate level up to the equivalent of a 4% saturation of fully air conditioned homes, or the equivalent of about a 20% saturation of room coolers. Beyond these saturation limits, supply cost per kwhr of additional cooling load is more than seven times higher than it is below these saturation limits.

2. Electric house heating is a natural complementary load to the summer cooling load. But even under the ideal conditions for a fully balanced acquisition of the heating and cooling loads, the economics of their combined load reflect an average cost per kwhr in the order of 2¾¢. This is 35% higher than the average of the end-block rates now in cities of over 500,000 population.

3. Under that level of pricing, the cost of electric heating with resistors is too high to be competitive with the cost of heating with gas or oil at prevailing prices. But heat pumps can be considered as desirable business for utilities at such level of pricing provided that:

a. Manufacturers can sell them installed in the home at a price below the cost of a good fuel-fired furnace and central summer air conditioning system.

b. The average annual performance factor of the heat pump system for heating is not less than three.

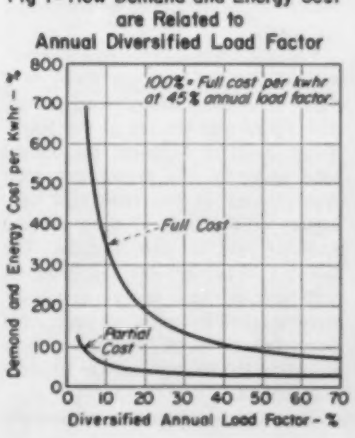
c. The unit is guaranteed by the manufacturers for prolonged reliability of operation.

4. To minimize undesirable operating practices by users and to increase the competitive appeal of heat pumps, rates for service for house heating and cooling should incorporate demand features. These should be so designed as to make the cooling load by itself more nearly self-supporting, thus increasing the competitive advantage of the heating load as an economically desirable complement to the cooling load.

5. Utilities, as public servants, must be prepared to supply service demanded by the public. Residential summer air conditioning is such a service. Its economics, however, are closely integrated with its complement, the service for home heating. For its own good the electric utility industry must devise means for supplying that service economically to itself and to its customers. Under the existing development of the art, only heat pumps offer that possibility.

Hence no efforts should be spared in their perfection by the industry as a commercially acceptable device at an early date.

Fig 1 - How Demand and Energy Cost are Related to Annual Diversified Load Factor



Service Supply Costs . . . Cost of service supply to a customer is the sum of the following:

1. Customer component of cost per customer, comprising costs due to the presence of customers on the system regardless of their demand and energy requirements.

2. The product of the customer's maximum demand and the unit cost of the customer-demand component per kw of such demand. This component comprises costs arising from the individual customer's maximum demand regardless of his load diversity and energy requirements.

3. The product of the customer's diversified demand (or his contribution to the class peak) and unit cost of the class-demand component per kw of such demand. The class-demand component consists of costs caused by the class peak or class of customers' diversified maximum demands.

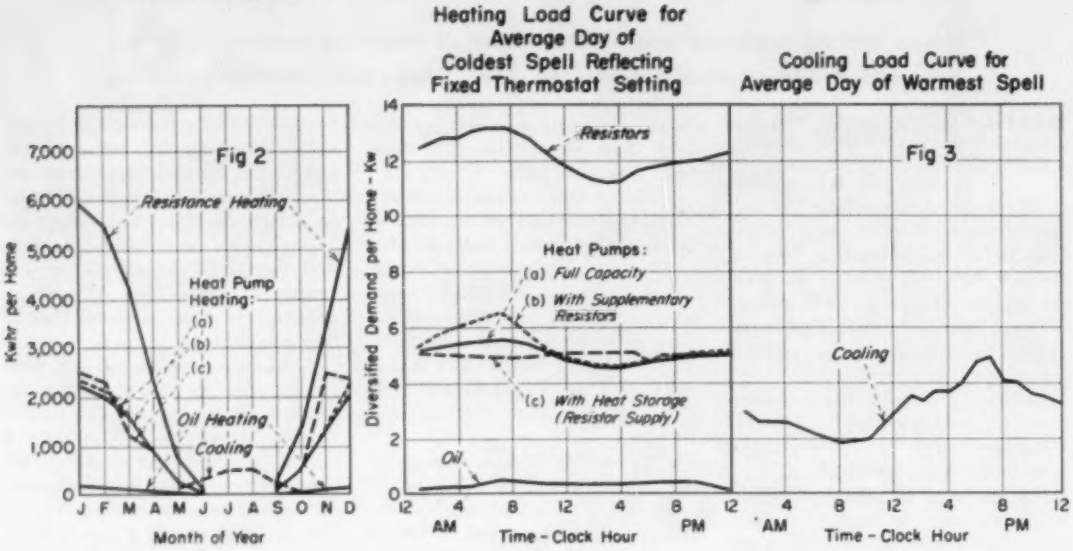
4. The product of customer's kwhr of energy and the unit cost of the energy component per kwhr of the class sales. This energy component comprises costs arising from the cus-

(*Continued on next page*)

The author acknowledges the helpful suggestions of I. L. Craig and the valuable assistance of W. W. Gilmore, E. H. Bromer, and A. Abramovitz, all with Philadelphia Electric, in the preparation of this material.

* "Load-Structure of a Modern Utility System". Constantine W. Bary, Proceedings of the American Power Conference, Volume XVI, 1954, page 401.

Figs 2-3 – Group Average Load Characteristics of Heating and Cooling – Average Home



Economics of Summer and Winter Loads Compared

(*Continued from previous page*)

tomers' energy requirements, usually for a year, regardless of their demands and load diversity.

Cost of service, as used here, means the average costs derived from analyses, prorations, assignments, or allocations of all elements of operating expense, taxes, allowances for depreciation, and an adequate return on the investment in plant required. The class-demand component for residential service comprises the demand costs of production, bulk power transmission, high tension distribution, primary substations, feeders, and secondary transformers. All these functional elements "feel," or have costs that are caused by, the diversified demands of customers when such customers are considered in groups or as a class.

The customer-demand, as contrasted with the customer, component includes costs related to certain portions of functional elements of a local distribution system's nature. These elements include primary branches, secondary transformer installations, and circuits which "feel" or whose costs arise from customers' individual maximum demands in excess of a predetermined magnitude regardless of diversity created by all customers considered in large groups or as a class. Such costs are not properly assignable to the customer or the class-demand components of cost.

Cost Curves . . . The relationship of the sum of the demands and energy cost components applicable to the residential class is expressed as per kwhr vs annual diversified load factors in Fig 1.

The customer component is not included as it is not needed to demonstrate the effect upon cost of the addition of the year-round air conditioning load to an existing class of residential customers.

The cost curves are expressed in percent of the full cost per kwhr at a 45% diversified annual load factor. This figure was selected as the 100% datum point to represent the annual load factor of the present-day total regular load of the residential customers on the basis of their average weekday peak in winter months. The full-cost curve reflects the total of both demands and energy cost components, thus including all such costs from the customers' premises to and including the elements of the production system.

The partial-cost curve expresses the sum of the energy and the customer-demand components only. These costs plot hyperbolically, the cost per kwhr rapidly increasing as the load factor decreases.

The partial cost per kwhr consumption at a 4% annual load factor equals the full cost per kwhr at a 45% load factor.

Electric Characteristics of Loads . . . Group average characteristics of the heating and cooling loads for a typical size home in Philadelphia, assumed here to have a 55,000-Btu-per-hr heat loss, for zero F outdoor and 70 F indoor temperatures, are shown in Figs 2 and 3. Data depicted were derived from tests and empirical relationships developed from them as a result of the systematic load research of the author for the Philadelphia Electric Co over many years.

Fig 2 shows the monthly kwhr expectable from the heating and cooling loads of such a residence and illustrates their seasonal nature. It brings out the smallness of the cooling compared with the heating energy use and the wide difference in the magnitude of the energy requirements of resistors and heat pumps compared with auxiliaries of an oil-fired heating plant.

The winter and summer sections of Fig 3 depict hourly diversified demands of the heating and cooling loads for the average day of the coldest and warmest spells, respectively. Demands thus obtained and used in conjunction with average unit-cost components should provide reliable indications on the economics of these loads.

The winter load curves represent conditions of the heating plants operating under fixed thermostat settings both day and night.

Winter curves show diversified demands of the three types of heat pumps are substantially alike in the forenoon and after 6 pm. The latter period comprises the critical peak period of the system and the residential class of service. This is an important feature in appraising their economic significance. Up to a certain saturation of the device, the three types have about the same economic effects on the residential class. But their diversified demands differ materially in the morning when the heat pump with supplementary resistors has the highest and that with storage the lowest diversified demands. This feature will affect the economics of these types beyond that saturation.

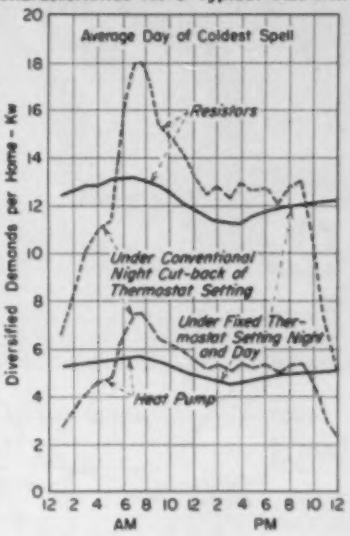
Demands Similar . . . While the cooling load curve peaks up between 6 and 1 pm, its magnitude is not greatly different from the winter demand of the heat pump.

Fig 4 compares the hourly load characteristics of a resistor installation and of a full-capacity heat pump when these are operated under both fixed thermostat settings day and night and under conventional night setbacks. The difference in diversified maximum demands is startling. For resistors with fixed thermostat setting, the diversified maximum demand is about 13 kw. But with a night setback it is 18 kw or almost 40% higher. The relationship is similar between heat pumps operating with and without night setbacks.

The economics of space heating, whether by heat pumps or resistors, therefore, are greatly impaired when all customers operate them with a night setback of thermostats as is customary with conventional fuel-fired furnaces. To make the space heating supply economically feasible to utilities, and in turn economically acceptable to customers, strong educational efforts and special rate features are needed to persuade customers to operate electric heating plants under fixed thermostat day and night.

The economics of heat pumps work in that direction. Operation with night setbacks requires a much larger capacity heating plant than design temperature requires so that house temperature can be restored quickly after the night setback period, particularly on cold days. This can be done only by oversizing the installation, perhaps 30 or 50% in relation to design requirements. This oversizing, increasing the customer's cost, is itself a deterrent. An adequate demand charge in the rate for heating would be a further deterrent.

Fig 4-Group Average Heating Load Characteristics for a Typical Size Home



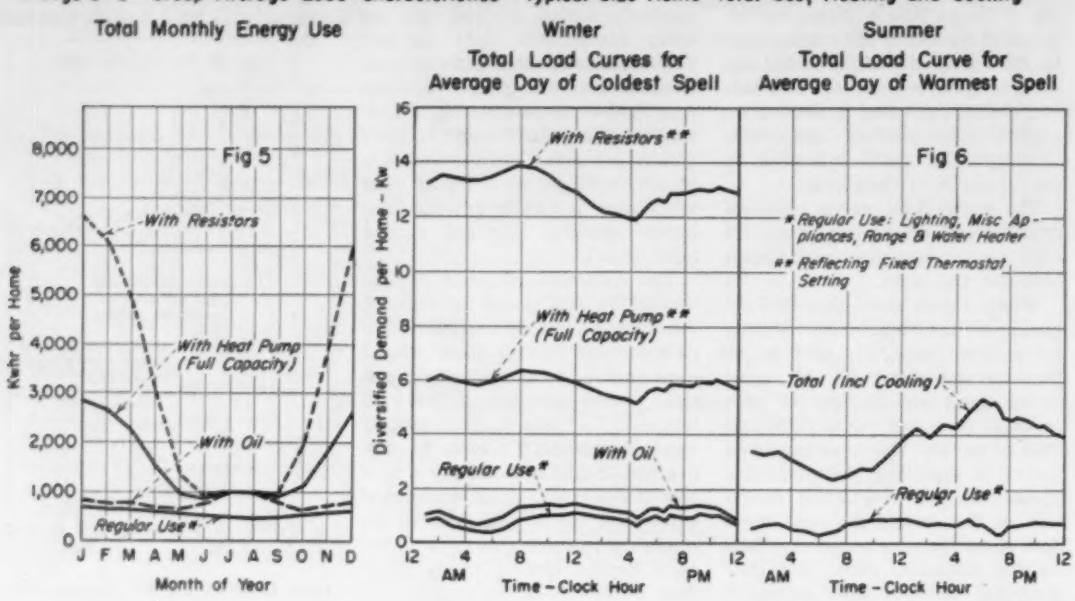
Total Load . . . Load characteristics of component loads of the typical-size home are shown in Table I. The table shows that the full-use regular residential load, comprising lighting, miscellaneous appliances, an electric range, and an electric water heater which operates under an optimum control cycle, produces an annual load factor of 71.2% on the basis of its diversified maximum demand on an average winter weekday. This contrasts with the annual load factor of 3.9% for cooling, and for electric heating ranging from 22.9% for heat

(Continued on next page)

Table I — Essential Load Characteristics of Component Loads of a Typical-Size Home

	Full Use Regular Residential Load with Optimum Water Heater Control	Cooling Load	Resistance Heating	Heat Pump			
				Full Capacity	With Supplementary Resistors	With Storage (With Resistors)	Auxiliaries with Oil Heating
Annual Energy Use Per Home — Kwhr							
Heating	—	—	29,280	10,850	11,400	12,680	795
Cooling	—	1,660	—	1,660	1,660	1,660	
Total	6,740	1,660	29,280	12,510	13,060	14,340	795
Annual Maximum Demands per Home — Kw. (Integrated Clock Half-Hour)							
(a) Diversified Maximum Demands:							
(1) Average Day of Coldest Spell	1.08	—	13.1	5.6	6.5	5.1	0.49
(2) Average Day of Warmest Spell	0.99	4.9	—	4.9	4.9	4.9	
(b) Customers' Non-Coincident Max. Demands	5.7	7.0	16.1	11.5	10.4	7.0	0.70
Annual Load Factor — %							
(a) Based on Diversified Maximum Demand	71.2	3.9	25.5	25.5	22.9	32.1	18.5
(b) Based on Customers' Non-Coincident Maximum Demand	13.5	2.7	20.8	12.4	14.3	23.4	13.0
Annual Coincident Factor — %	18.9	70.0	81.4	48.7	62.5	72.9	70.0

Figs 5-6 - Group Average Load Characteristics - Typical Size Home Total Use, Heating and Cooling



Cooler and Heat Pump Demands Are Comparable

(*Continued from previous page*)

pumps with supplementary resistors to 32.1% for heat pumps with heat storage.

Maximum diversified demand of the regular residential load, in the order of 1 kw per home, contrasts with demands for heating of 13 kw with resistors, and from around 5 to 6½ kw for heat pumps in the winter. Air conditioning demands are comparable to those of winter demands of heat pumps.

The magnitude of these demands for heating and cooling, coupled with their low annual load factors in relation to the full-use regular residential load, is basically the feature that handicaps the economic feasibility of electricity for home heating and cooling loads.

The group average electric load characteristics of the total service of a typical home are depicted in Figs 5 and 6. The curves in these graphs resemble those shown in Fig 2 and 3, and through this similarity are brought out the following important features:

1. Energy for heating, by resistors and heat pumps, exceeds by far the combined energy use for lighting, miscellaneous appliances, range, and water heater.

2. Annual energy use for cooling is relatively minor compared with annual energy requirements for the full-use regular residential load.

Yet the hourly load demands for heating in the winter and cooling in summer predominate the hourly demands of the regular residential use. These phenomena, together with the relative flatness of the daily load curves for the regular residential use, preclude practical introduction of load-control or load-interlock features on heating and cooling installations. Such control or load-interlock features would secure a substantial improvement for the incremental load characteristics of such loads.

These graphs set forth clearly the economic problems of supplying service for the residential heating and cooling loads. Their annual load factors are low, and their diversified maximum demands per installation are many times the demand per customer ordinarily created by the regular residential load.

Possibilities for Balancing Loads . . . The foregoing analysis dealt with the comparison of the heating and cooling loads by themselves and in relation to the regular residential load of a typical size home. Such an analysis would be incomplete unless the possibility of fitting the heating and cooling loads into the total load of the residential class is investigated. This follows, employing the established general theory of utility load structure as described elsewhere in a paper by the author.*

Observations on acquiring the cooling and heating loads are given in Table II. The available margin between the winter and summer peaks makes it evident that some summer cooling load may be acquired at no increase in the class peak and, therefore, only at partial costs which need not contain any of the class-demand components of costs. According to the table, such acquisition may progress up to a 4% saturation of fully air conditioned homes. An acquisition of this size is equivalent to 160,000 ¾-hp room coolers, a 23% saturation.

Because the annual load factor of this cooling load, as shown in Table I, is 3.9% and the partial cost per

(*Continued on page* 20)

*"Load-Structure of a Modern Utility System". Constantine W. Bary, Proceedings of the American Power Conference, Volume XVI, 1954, page 401.

No Finer Apparatus Insulator!

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made of Purified Porcelain . . .

VICTOR
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2. **PRECISION ASSEMBLY** assures perfect alignment . . . greatest possible stacking ease.
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SPECIFICATIONS (SINGLE UNIT)

60 cycle dry flashover	160 KV
60 cycle wet flashover	95 KV
Pos. impulse flashover*	235 KV
Neg. impulse flashover*	290 KV
Withstand voltage 60 cycle dry	115 KV
Withstand voltage 60 cycle wet	75 KV
Withstand impulse voltage*	210 KV
Puncture	215 KV
Dry arcing distance	14⅜"
Leakage distance	33"
Tension strength	20,000 lbs.
Torsion strength	40,000 lbs.
Compression strength	60,000 lbs.
Cantilever strength base mtd.	7000 lbs.
Cantilever strength cap mtd.	4000 lbs.
RNI	100 microvolts
1000 KC at applied	22 KV

*Crest KV. 1½ x 40 microsecond wave critical value.

For the full facts on Victor "Know-How," write for "The Story of Victor and Purified Porcelain." For engineering data on Victor insulators, write for Bulletin No. 4.

NEWS FROM VICTOR

To take care of expanded test facilities, the Victor high voltage laboratory has been greatly enlarged and a new 120,000 pound Tinius-Olsen hydraulic testing machine (shown in drawing above) installed. This machine exerts a programmed load on a test piece while subjected to high voltage current. Tests are run to destruction either by mechanical or electrical failure.

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Table II — Effect of Balancing Heating & Cooling Loads

Present-Day Conditions (Winter Peak of Residential Class Exceeds Its Summer Peak)	
Margin by Which Winter Peak Load Exceeds Summer 6 PM Load	130,000 kw.
Diversified 6 PM Load of Cooling Per Home	4.7 kw.
Number of Homes with Cooling Which Can Be Acquired at "Partial Cost"	28,000
Percent Saturation of Homes with Cooling	4.0%
Equivalent Number of ¾-hp Room Coolers	160,000

Condition After Winter Peak of Residential Class Is Balanced with Its Summer Peak by Addition of Cooling Load	Type Home	
	Resistors	**Heat Pump**
Demand of Home Heating at 6 PM Winter	11.7	4.8
Demand of Home Cooling at 6 PM Summer	4.7	4.7
Balanced Combination of Homes with Cooling to Homes with Heating	2½ to 1	*
Annual Energy Use of Balanced Combination:		
Heating	29,280	10,850
Complementary Cooling	4,150	1,660
Total	33,430	12,510
Annual Diversified Load Factor of Balanced Combination on Basis of 6 PM Loads	33%	30%
"Full Cost" to Serve Balanced Combination (in % of Full Demand & Energy Cost at 45% Annual L.F.)	130%	135%

*Heat Pump Provides Its Own Balanced Combination of Heating and Cooling Loads.

Heating With Resistors Can't Compete

(*Continued from page* 18)

kwhr at that load factor is equal to the full cost per kwhr at a 45% annual load factor, the acquisition of the summer air conditioning load up to a 4% home saturation is economically equivalent in cost per kwhr to the acquisition of the regular residential load at a 45% annual load factor. This load factor incurs the full cost of service supply.

Beyond this saturation, the residential class peak will shift to the summer period, and any additional air conditioning load will have to bear its full cost responsibility. Such full cost per kwhr of air conditioning load is more than seven times the partial cost per kwhr at the 4% load factor, or over seven times the full cost per kwhr at a 45% load factor.

Table II depicts what happens after peak equalization conditions are attained and combined home heating and cooling loads are acquired in the best conditions for maintaining equality between the winter and summer residential peaks.

Optimum Load Factor . . . The optimum load factor for the combined heating and cooling load does not exceed 33% with resistors and 30% with full-capacity heat pumps. For these deteriorated load factors the full costs per kwhr are 30 to 35% higher than they would be for an annual load factor of 45%.

Rate Levels . . . To emphasize this feature, let us assume that an end-block rate of the residential service, at around 2¢ per kwhr, is compensatory with respect to the cost of supplying all additional energy for the regular residential use that does not reduce the annual load factor below 45%. Then to provide the same compensatory results from the combined heating and cooling loads at the optimum load factors of 30 to 33%, the average rate would have to be in the order of 2¾¢ per kwhr.

At such a rate level the cost of heating with resistors is far from competitive with conventional fuels; in fact, it is over four times the cost of heating with gas or oil at prevailing prices. But at that rate the cost of heating with heat pumps, with further practicable improvements in performance factors, may be considered competitive in view of the elimination of all combustion from the home. The competitive possibility of supply to heat pumps can be further improved by a rate feature which would make the cooling load (which will usually precede the application of the heat pump) more nearly self-supporting. This can be done by providing a demand charge in the rate structure. Such a change, on an annual basis, would apply to the kw of either the heating or cooling load, whichever is higher.

Saturation . . . Previous observations, based upon the magnitude of the heating loads at 6 pm, are valid for certain saturation limits. For heating installations, operating with the conventional night cutbacks in thermostat settings, the saturation limit approaches 5% for resistors and 10% for heat pumps.

Each of these limits is tripled, however, when heating is operated under fixed thermostat setting both night and day.

Limits of saturation of heating and required cooling loads in the home that would provide a 45% annual load factor on the basis of heating load demand-responsibility at 6 pm are 0.5% for heating and 5% for cooling, when resistors do the heating. With heat pumps, these respective limits are 1 and 4%.

Acquisition Limits . . . In these limits lies the refutation to careless assumptions that there need be no concern about acquiring heating load at existing value of end-blocks of residential rates, merely because it complements the cooling load. Economically this is possible only when the combined heating and cooling load provides a 45% annual load factor. This is feasible now because of the margin between the winter and summer peaks of the entire residential class load, such condition being only obtainable with the heating saturation mentioned.

But this condition involves acquisition of the two loads in the ratio of ten house cooling jobs to one resistor type heating job, or four house cooling jobs to one heat pump job. These saturation limits are too small to justify the gamble of acquiring these loads at rates generally applicable to a 45% annual load factor load. The economics of such practice would be short-lived as the extension of a rate applicable to a 45% annual load factor load cannot provide an adequate return for a load which, in the long-run, provides at best only a 30% annual load factor.

Residential heating and cooling loads combined inherently fall into this category.

Research for New Savings in Power Plant Operations

HOW MANY DOLLARS PER INSTALLED KILOWATT?

Holding the line on initial costs has been a matter of increasingly great concern to power plant men, particularly in the last several years. That they have made important strides is indicated by the fact that installed costs per kilowatt have not risen in anywhere near the ratio of increases in land and general construction costs.

Several factors have made these savings possible. Many new plants are being erected for outdoor or semi-outdoor operation, thereby eliminating some costly construction. Another important cost-cutting answer involves building large-capacity individual boiler-turbine units which can be housed in smaller structures. Here, boiler design must afford genuine savings in space and volume, and B&W's development of the furnace division wall has been a marked advance in this respect.

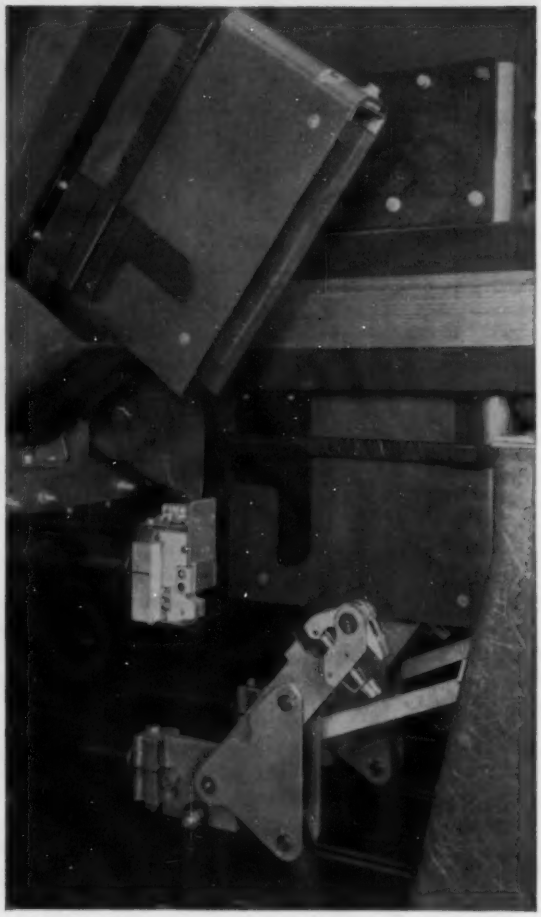
Continuing research and engineering development offer the best hope for further progress. In congested urban areas, can older units be replaced when necessary with units of greater power, without requiring more land or larger buildings? Is greater simplification of equipment practical? Can additional use be made of less expensive materials? Can manufacturing techniques be improved to speed shop fabrication and simplify field erection?

Some answers have already been found. Engineering achievements such as the Cyclone Furnace and Pressure Firing are saving on installed costs by eliminating or simplifying such auxiliary equipment as coal pulverizers and piping, various controls, precipitators, ash-handling equipment, induced draft fans, ducts, foundations and similar items. B&W's new Universal Pressure Steam Generator, which has no steam drum, is also an important contributor to savings in space and structural costs.

To many of the questions there are no pat answers. But the inquiring staff of engineers, physicists, chemists, metallurgists, and technicians at B&W's fully-integrated Research Center in Alliance, Ohio, are seeking solutions to many of these problems. Using a vast array of apparatus, they are exploring many sides of many questions in fuels, combustion, steam generation, ceramics, heat transfer and metallurgy, to help find ways of making power cheaper and more abundant. The Babcock & Wilcox Company, Boiler Division, 161 East 42nd Street, New York 17, N. Y.

Come to the plant and going into I-T-E Metal-

1. Horizontal drawout design. Even heavy 15 kv circuit breakers, such as this one, roll out easily on permanently attached wheels. Breaker compartment is full-depth, one-piece welded frame, retains shape, permits lifting as a unit.

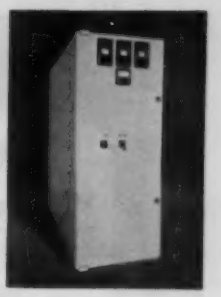


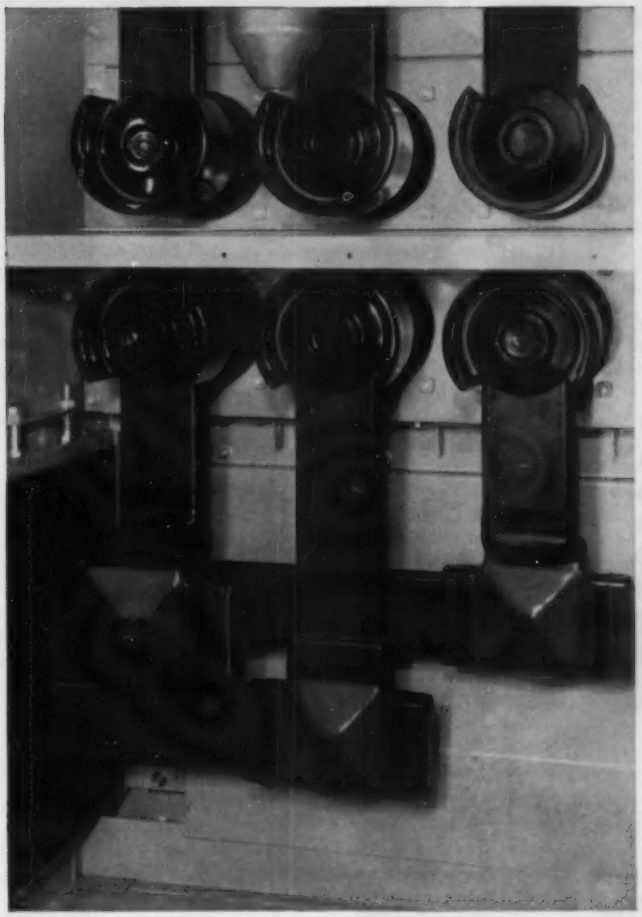
2. Positive arc interruption. On 15 kv breakers, double-coil, closed-iron magnetic blowout circuit draws arc rapidly into overhead quenching chute. Pivoting arc chutes, shown above, facilitate maintenance. Note sturdy contact assembly.

Discover in these pictures just a few of the extra-value, quality features in all I-T-E Metal-Clad Switchgear. They were taken right here in the I-T-E plant and show the equipment in process of manufacture.

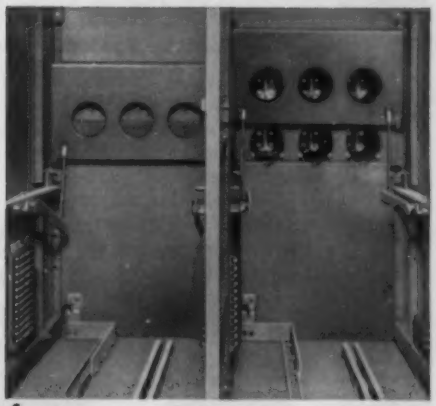
If you're planning new construction where you will need metal-clad switchgear, take a tip that can help you make the very most of your investment dollar: Visit the I-T-E plant here in Philadelphia. See the quality features actually being built into the equipment—quality that keeps I-T-E Switchgear performing more safely and dependably all the years it serves you. See the scenes shown on these pages, plus dozens more like them. See the extra value in I-T-E Switchgear that you won't find in any other

see the extra value Clad Switchgear





3. Bus rigidly braced, heavily insulated. View into rear of 15 kv compartment shows porcelain disconnect bushings and bus supports which insulate and hold the bus in alignment during short circuit stresses. Steel paneling throughout forms isolated compartments.



4. Superior isolation of compartments. Gravity-type shutters, shown closed at left and blocked open at right, isolate primary terminals from breaker compartment.

5. Fine, durable finish. All panels and doors are sanded, bonderized and cleaned with spirits, then painted with three coats of enamel—baked on and rubbed down.

make. I-T-E Metal-Clad Switchgear is available in ratings through 13.8 kv, 500 mva.

For details, contact the I-T-E field office nearest you. Look in your classified directory under "Electric Equipment." I-T-E Circuit Breaker Company, Switchgear Division, 19th and Hamilton Sts., Philadelphia 30, Pa.

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G&W TYPE

"St-Sodertite" Potheads

SOLDERED PORCELAIN

Moisture, Oil and Gas Tight Factory Sealed Joints Without Gaskets

These potheads are factory assembled, with metal-to-porcelain soldered joints. This method completely eliminates the possibility of future trouble due to loosely gasketed joints. When these potheads are used, the responsibility for properly sealed joints rests with our factory. Troubles due to aging, cold flow and permanent set of gasket materials are eliminated.

Since introduced in 1940, G&W "Sodertite" potheads have achieved an enviable service record and have been adopted by many utilities.

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50th ANNIVERSARY

A543A

Pres W. J. Clapp tells SEE Engineering and Operation Section meeting . . .

Engineers Must Take Part in Civic Work

Social problems hold the greatest threat to today's civilization. Many of these are perplexing, but engineers can contribute to their solution. This was the message of Pres W. J. Clapp to the Southeastern Electric Exchange engineering and operation conference at New Orleans April 7. Clapp is also president of Florida Power Corp.

Engineers can view with pride their vital role in economic life, Clapp said. But civic work is their real opportunity to benefit civilization. He urged that young engineers look over their community activities and participate where they have ability to contribute.

Young graduate engineers hired today must solve the industry's future problems, advised J. E. Barkle, Westinghouse Electric Corp. This future, by 2000 AD, means 10 to 15 times today's system capacity, with radical changes in equipment design. Yet the number of top-grade students interested in utilities declines almost as fast as the industry is expanding.

Utilities must devote real effort to attract young engineers. He urged:

1. Bring entire salary structure in line with national trend.

2. Provide opportunity for advanced education.

3. Encourage professional growth and recognition.

4. Assign responsibility to match attainment.

5. Make work challenging.

6. Map out management development programs to insure opportunity to progress.

Planning

"We must look ahead not only to be prepared for our own future facilities but also to protect our plans against . . . . others," said George Kinsman, Florida Power & Light Co. He was referring to real estate planning far in advance of developments which make it difficult and expensive to obtain rights-of-way and sites.

Kinsman said his company's planning is based on expected load levels —not a specific time—and consists of two parts: generation and transmission, and distribution. Each requires both long-range planning for load levels of two, three, or four times present (5 to 10 years) and short-range planning of one or two years for distribution and three or more for generation and transmission.

Forecasts of growth are obtained from monthly station peaks adjusted by sales personnel. Consultants are sometimes employed to study market and population growth.

Judgment must be applied to selection and operation of equipment to guard against early obsolescence, said H. L. Deloney, Louisiana P&L. He advocated design to hold distribution interrupting duties below 8,000 amp, preferably to 4,000 amp, to avoid burndowns and equipment trouble.

Distribution

Delony labeled distribution transformer taps "a big mistake." Elimination would stop costly field changes and harmful misadjustment. The savings might pay for regulators to provide customers a higher class of service. He suggested regulation of substation buses by a combination of conventional compensators and time clocks to factor in load characteristics.

Operating utilities should decide what higher secondary voltage they will render before receiving actual requests, said J. B. Coltharp, Gulf States Utilities Co. Over 50% of a large number of southern utilities surveyed said that they are serving or willing to serve loads at 277/480 v.

"We should also decide immediately on what minimum load we will serve at the higher voltage." Coltharp suggested 250 kw from the overhead and 500 kw from the underground. He also enumerated the following problems with 277/480-voltages:

1. A new group of more costly transformers must be stocked.

2. Metering with or without instrument transformers must be clarified for safety and economy.

3. Some 120-v loads of a small customer may be in a building served by the higher voltage. Will the building owner serve and meter such loads? This violates most rate structures.

(*Continued on page* 27)

GENERAL SESSION SPEAKERS included (l to r): F. C. Weiss, Alabama Power; Chairman S. L. Muths, Mississippi Power; H. L. Deloney, Louisiana Power & Light; J. E. Barkle, Westinghouse Electric; and E. M. Clapp, Georgia Power

TYPE GA-H—CABLE TO H-BEAM FENCE POST—*This grounding connector joins wide range of standard H-beam posts to fence fabric and cable. Range of cables easily accommodated. Sizes available for grounding more than one cable. One-wrench installation.*

TYPE GD—2 CABLES TO PIPE
Clamp-type ground connector for joining range of two equal cables or single looped cable to pipe or column. Especially convenient for grounding fence posts. Wide range of sizes.

TYPE GX—CROSSED WIRES OR CABLES—*Simple, rapid connection, easy to inspect. Recommended for crossing ground conductors in order to secure greatest efficiency in reducing voltage gradient. Connector takes wide range of sizes.*

TYPE GB—CABLE TO FLAT SURFACE
Connects wide range of ground lead cable to flat structural or equipment surfaces. Can be furnished with larger than standard size bolts for pre-punched holes in steel work. One-wrench installation.

TYPE GP—2 PARALLEL CABLES 90° TO GROUND ROD—*Clamp-type connector joins two parallel cables at right angle to ground rod, pipe, or column. Accommodates range of cable sizes in each groove.*

TYPE GAR—CABLE TO ROD OR PIPE...PARALLEL OR 90°
Double-purpose ground connector—joins ground bus to rod or pipe either parallel or at right angles. Easily installed by tightening two nuts on U-bolt. Accommodates wide range of cable.

TYPE GK—3 EQUAL CABLES TO GROUND ROD OR PIPE—*This connector is frequently used to join grounding conductor, grounded member, and looped ground bus, at one point. Accommodates wide range.*

TYPE GG—BRAID, BAR, LEAF, OR CABLE TO PIPE—*Joins flat flexible braid or copper bar to ground pipes, fence posts, and columns. Highly effective for grounding operating rods, switch handles, gate posts. Can be used with stranded cable by splaying ends under clamp.*

TYPE YA (HYLUG)—GROUND CABLE TO FLAT BAR—*Compression connector—one-piece terminal, easily and economically installed with Burndy portable Hypress. Available for #8 str. to 1000 Mcm.*

9 sound solutions to the problem of

GROUNDING

Engineered to the same precise standards as connectors that carry continuous current loads . . . Burndy grounding connectors can be depended on to provide permanent protection against

• ARC-OVERS • ELECTRICAL LEAKAGE
• LIGHTNING • DIRECT SHORT CIRCUITS

These nine designs are available in 30 variations for connection to driven rod, pipe, cable, fence post, structures, lamp standards.

Send for the Burndy Grounding Catalog, which offers an interesting technical discussion on approved techniques, methods, and materials for proper grounding.

BURNDY

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SEE Engineers . . .

(*Continued from page* 25)

4. Circuit protection must get rigorous attention at the higher voltage because it is not "self clearing" as 208 and 240 v are.

5. More-expensive current limiting fuses may be required because one manufacturer says the standard NEC lead zinc fuses should not be generally used on 277/480-v systems.

Referring to the higher secondary voltage problem, P. G. Whitmore, Ebasco Services, Inc, said the "gallstone today is in the wiring of existing buildings," not in the utility facilities. For 3-phase other than factories, secondary voltage should be either 220/380 or 240/416, and for single-phase, either 220/440 or 240/480.

Potomac Electric Power Co saved $52,656 last year by leaving 150,000 services to empty residences energized, reported W. O. Jackson. No difficulty has resulted from damages or code restrictions.

A capacitor having 4% reactance appears to be the most suitable for connecting in series with a distribution transformer primary to regulate secondary voltage, said R. F. Lawrence, Westinghouse. This rating is applicable to transformers on 95% of primary feeder length.

These conclusions were based on a study to determine the proper capacitor characteristics for transformer application, without restricting current, voltage, and reactance to existing standards. Keeping the voltage within the favorable limits was the main criterion. A current value of 2½ times the transformer rating was selected for the capacitor.

Georgia Power Co is benefiting from organization and mechanization changes, reported W. L. Westbrook. Decentralization has cut travel time which averaged 25%. Crew morale has improved also, and service restoration during emergencies has been expedited by having self-contained units away from the confusion of central headquarters.

Mechanization of tree trimming operations increased output 100%, Westbrook said. A five-man crew (a foreman, two foresters, and two truck drivers) operates an aerial bucket, a chipper, and a dump truck. Labor savings alone pay for equipment in a little over two years.

Utilities are obligated to take action to eliminate hazards of TV antennas near power lines, warned George E. Hervey, Appalachian Electric Power Co. When a dangerous condition exists, the company should notify the party creating the hazard. A record of notification will aid the company's defense against a law suit. One city has passed a helpful ordinance.

NOISE RECORDINGS assist J. R. Mann, Allis-Chalmers, to demonstrate remedies to N. H. Erlandson, (left) Carolina P&L; and Chairman T. J. Allen, Georgia Power

Substations

Lower noise levels are in sight for power transformers, J. R. Mann, Allis-Chalmers Manufacturing Co, told the transmission and substation group. New tests measure magnetostriction of core steel samples in four minutes. Much steel shows low magnetostriction, but variation is considerable. He implied that careful selection could achieve marked reduction in this source of transformer noise.

But substation noise sometimes can be reduced more economically by placing acoustical barriers in proper relationship to conventional equipment. Mann cited heavy masonry as the most effective, but a complete enclosure requires surface treatment to suppress echoes.

"Oil is the life blood of equipment," said Paul E. Hilliard, Appalachian Electric Power. Nothing is more important than the best possible program of oil inspection and maintenance. Tests suitable for field use, he advised, are dielectric strength, color, neutralization number determined by adding potassium hydroxide, and power factor. Oil which passes these tests is considered entirely suitable for continued use. When these tests show oil unsatisfactory, it can often be reconditioned in the field.

Hot line methods are used in substation maintenance and expansion to avoid service interruptions, reported H. A. Peterson, Florida Power. But because jobs requiring them are infrequent, they require careful planning and very close supervision. Work on voltages up to 8 kv requires rubber blankets, line hose, hoods, and gloves used by linemen. And 12 kv or higher requires hot-line methods to isolate work from hazardous areas.

Increase in system kva boosts interrupting duty on substation fuses, said W. H. McClure, Alabama Power. Other difficulties are need for more load capability, coordination, and corona deterioration. Present solutions, he said, are limitation of fault current and more careful selection of locations. Experiments point to shielded tubes as a cure for corona. But the only satisfactory way to provide more load capability is to install circuit breakers.

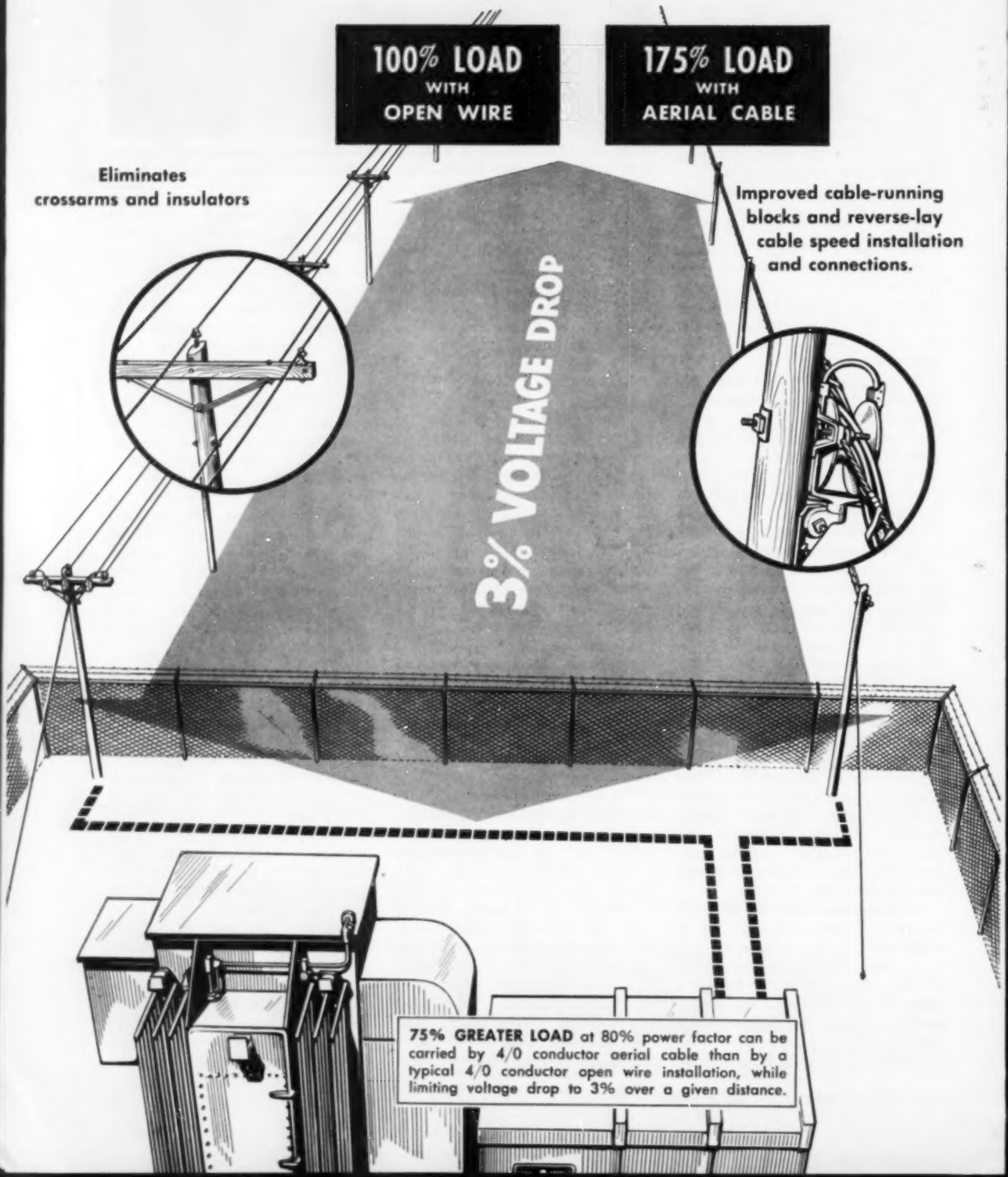
Transmission

Bundled conductors are operating successfully on two 110-kv lines of Carolina P&L, reported N. H. Erlandson. First of these had conductors in vertical cunfiguration (EW, July 12, 1954, p 106), the second used horizontal configuration. More operating experience is needed. Erlandson predicted economy in designing lines for future bundling but operating initially with single conductors.

Procedure for readying Virginia E&P's new Portsmouth unit feedwater cycle for initial operation represents a radical change from past practice, reported J. D. Ristroph. In order to avoid high silica content from the sandy soil, the new method pumped

(*Continued on page* 43)

Greater Load-carrying Ability Proves


100% LOAD
WITH
OPEN WIRE
175% LOAD
WITH
AERIAL CABLE
Eliminates
crossarms and insulators
Improved cable-running
blocks and reverse-lay
cable speed installation
and connections.
3% VOLTAGE DROP
75% GREATER LOAD at 80% power factor can be carried by 4/0 conductor aerial cable than by a typical 4/0 conductor open wire installation, while limiting voltage drop to 3% over a given distance.

Economy of Aerial Cable Feeders

Continuing improvements in installation techniques indicate further reductions in cost

Because of its lower reactance, General Electric Super Coronol* preassembled aerial cable can carry far more load within a permissible voltage drop than open wire of the same size. Thus, if you evaluate cost on the more realistic basis of dollars per kva of load instead of cost per mile of line, the initial cost of aerial cable is actually only 3 to 12% more than open wire. (See comparative graphs.)

You also receive these extra benefits:

BETTER APPEARANCE

Crossarms, insulators, and unsightly open wire lines are eliminated.

LOWER MAINTENANCE COSTS

Fewer storm damage repairs, less tree trimming, no insulation festooning.

FEWER OUTAGE REVENUE LOSSES

Greater reliability—because messenger-supported cables are far less vulnerable to damage by elements and falling trees—reduces feeder outages and resulting loss of revenue. Better service continuity improves customer relations.

INCREASED LOADS

Greater loads can be carried on voltage-limited 4160-volt feeders, up to a load density of 7500 kva per square mile, because of the combination of the low reactance and 85 C copper temperature of G-E Super Coronol preassembled aerial cable.

For additional facts send for "Economic Performance of Aerial Cable for Distribution Systems." Address Section W-154-527, Construction Materials Division, General Electric Company, Bridgeport 2, Connecticut.

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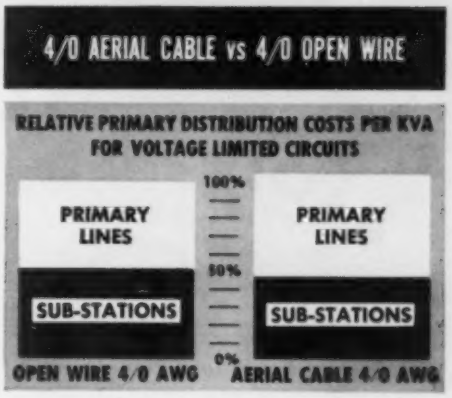
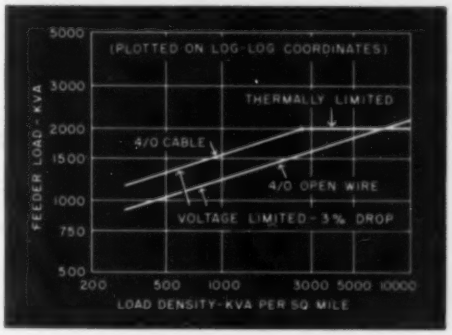


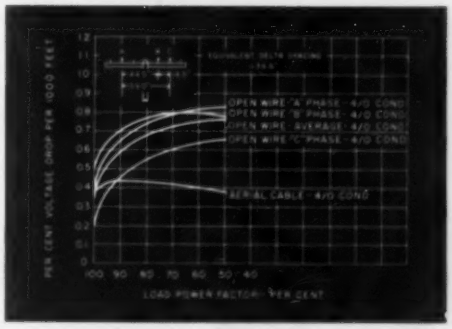
COST

Comparative primary distribution costs per kva for voltage limited circuits



FEEDER LOADING

Load density characteristics of 4160-volt feeders with 3% voltage drop limitation



VOLTAGE DROP

Voltage regulation per 1000 feet 4.16 kv feeders, 1000 kva base, 3 phase

Progress Is Our Most Important Product

GENERAL ELECTRIC

COLUMNAR SUGAR MAPLE, this type serves excellently where wide spreading forms would interfere with buses

BUISMAN ELM, a hearty, Dutch-elm disease resistant variety, is shade tree recommended for lawn or home planting

CEI Plans Trees for Tomorrow

Cleveland utility, to cut line clearance costs, offers communities package plan involving expert arboreal advice on what trees to plant, where, and why

With the expectation that its power services will at least double in the next decade or two, Cleveland Electric Illuminating Co has been taking a close look at its operating costs, in particular its line maintenance costs. Studies have shown that the company is spending better than $1 million a year for clearance work on the 44,000 miles of lines in its 1,700 sq miles of service area. This means keeping trees from interfering with lines.

At the recent Street Tree and Utility Conference, Harry T. Sealy, CEI vice president, said: "The greatest cause of service outages in the normal electric system is the result of conflict between trees and power lines. We could be short-sighted and blame this on the trees, but we must remember that trees are good citizens—that trouble arises only when they are found in the wrong places."

Line clearance has long been a sore spot in CEI's public relations because tree owners often feel, says a company official, "the same way about trees as they do about pets." Tree owners have to be approached on an individual basis. They frequently object strongly to having trees trimmed or removed even if the net result is better insurance of uninterrupted electric current. All of this tree-clearing work is contracted out by CEI to private tree surgeons and nurserymen

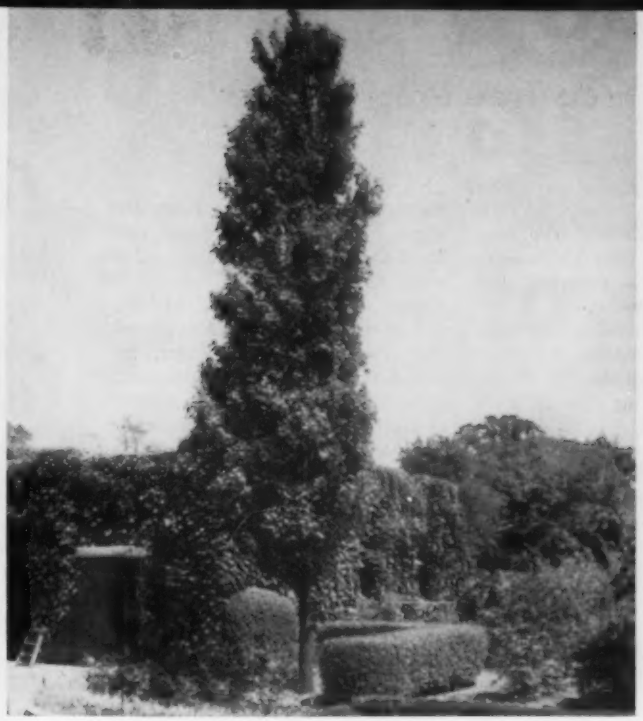
These are the leaf shapes of trees recommended for street planting:

Flowering Dogwood

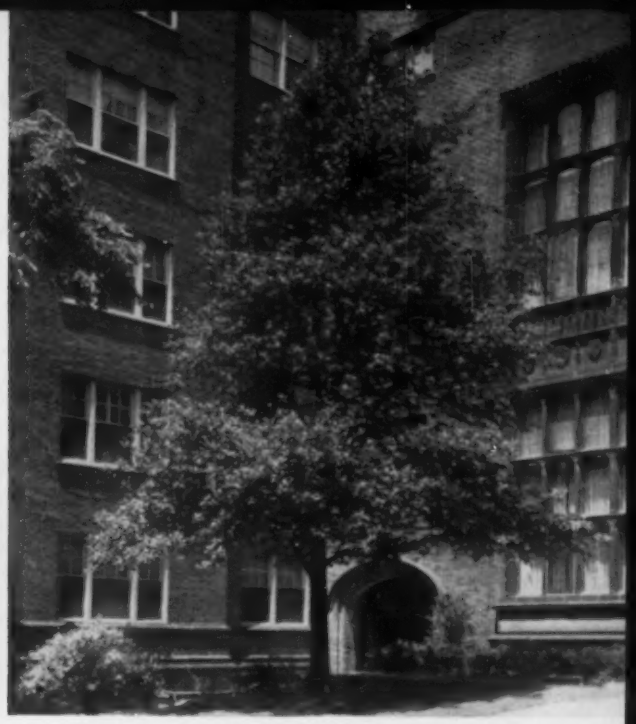
Sassafras

Chinese Scholar Tree

Zelkova



ARMSTRONG RED MAPLE, is trim, narrow-column tree useful in planting situations where its 10-ft spread is adaptable



WHITEBEAM MOUNTAIN ASH, a trim pyramidal tree, is fine type for narrow treelawns and a shallow building setback

after permission has been obtained by the company from the tree owners to do the trimming.

In order to improve the public relations aspects of this work and to cut its future line clearance costs as much as possible, CEI has hired a consulting arborist whose sole job is to prepare master tree planting plans for any of the 137 incorporated communities in the company's service area, free of charge.

Objective of the plan, particularly in the many budding suburban communities around Cleveland, is to plant trees of a type and so spaced that 20 years from now the burden of CEI's line clearance work will be substantially reduced. At the same time this will mean a big reduction in the cost of such work.

In examining the problem of line clearance at present, CEI notes that a majority of the trees in residential areas in metropolitan Cleveland and the older suburbs are silver maples and American elms. Both trees are quick, spreading growers—"really forest-type trees," says the company—with brittle branches which snap off easily in high winds and frequently cause outages. The company is not too hopeful of curing this situation in areas where such trees are already planted in profusion. But it sees, in the many new communities springing up on the outskirts, an ideal way to reduce costs in 10 to 20 years.

Sealy cited an example of how this worked in his conference talk. In a nearby city the city government was planning on putting in a large number of trees. If left to their own devices, the city officials would not have considered the future effect of these trees on the utility facilities.

"We offered the services of our consulting arborist who found that there were plans afoot to plant some 2,000 silver maples," related Sealy. "His expert advice swayed the city fathers, and these oversized, brittle trees were not planted.

"Now if we consider that one out of each two of these silver maples would have come into conflict with

(Continued on next page)

Golden Rain Tree

Flowering Crabapple

Little Leaf Linden

Paul's Scarlet Hawthorn

Cleveland Electric Offers Cities Free Tree Program

(*Continued from previous page*)

our overhead lines, we see that we would have had to contend with 1,000 misplaced trees. Allowing ten years for the trees to grow to a size to be a real menace to overhead installations —and allowing a 40-year life cycle— we see that we would have had to cope with 1,000 misused and misplaced trees for a period of 30 years. We like to base our tree trimming on a three-year cycle . . . (thus) we would have had to trim these thousand trees ten times in the next 30 years. We figure the cost of trimming 10,000 trees at $50,000.

Savings Come in Future

"We can't point to our books right now and say: 'Right here we saved $50,000.' But over the course of the next three decades there is $50,000 less that the company will have to spend. And remember that this is only one instance in one community."

The tree planning program is a less costly alternative to CEI than running its wires underground. A rough estimate places the present cost of going underground at $40-50 million, and this course could easily treble line repair costs and greatly lengthen downtime when an outage occurred.

To get its program going, CEI last year hired Edward Scanlon, a forestry graduate of the University of Michigan and for seven years Shade Tree Commissioner for Cleveland. During his work for the city, Scanlon attracted the attention of Lee C. Howley, then city law director, and now a vice president in charge of the legal and public relations departments for CEI.

Tree Expert Hired

When Scanlon left his city job, Howley outlined to CEI management a plan Scanlon had advanced for a tree planting program and suggested the company hire Scanlon on a consulting basis.

To back up Scanlon's tree planning service, CEI sent out a four-color brochure, "Trees You Can Live With," to 669 municipal and county officials. This brochure outlined what the service was and how it was available. The booklet shows what trees will fit in what spaces, how they should be selected, what is necessary for their care, what problems can arise from planting the wrong trees (traffic lights obscured, sidewalks uprooted, and sewers clogged by roots).

Scanlon then began an individual follow-up on the mailing, which so far has brought him the job of preparing master planting plans for eight Cleveland suburbs.

In making up a master plan, CEI's tree expert makes up a chart for each street or block in the city. He makes notation of the direction of streets, paving width, sidewalk width, tree lawn width, lot width, how far buildings are set back from the street, the height of buildings, and what kind of transportation will move over the street. The last is considered important because if there is much bus or truck traffic, any tree types which branch out close to the ground are eliminated.

Also considered is the economic status of the neighborhood—whether it is likely to remain a residential area for years, whether it may become slum property, or whether it is likely to be converted to industrial sites.

He also makes note of the type of overhead wiring, its location and height; the type of street lighting used (center, off-set, upright, corner); and site factors such as drainage and soil Ph.

Tree Types Specified

When all these factors have been taken into consideration, Scanlon makes his recommendation for planting. He specifies the trees by scientific and common name and where and how far apart they should be planted. But that is not all. Included in the plan is expert aid in setting up the means and techniques for organizing and financing such a program—model legislation, tailored to the individual needs of the community, a maintenance plan for new and old plantings, and organization of basic equipment needs. This complete package is then turned over to the community entirely free of charge.

While the primary aim of the program is to save money for CEI, the company does not overlook the esthetic aspects of planting trees. Trees are chosen for color, longevity, and shape. Where elms are desired, only the Buisman and the Japanese Zelkova, both resistant to Dutch elm disease, are recommended. And the various advantages of such shapes as oval, pyramidal, and globular, are related to specific local requirements.

Responsibility for the project as far as CEI is concerned ends with the planning. The company does not get involved in any tree planting or uprooting. This is left strictly to the communities themselves.

Many of the suburbs find themselves hampered by old, out-dated ordinances governing tree planting and trimming which in some cases restrict city planners on the number and type of trees which can be planted. When a snag of this type develops, CEI's legal department is ready to make recommendations to town councillors on how they can amend their ordinances to suit a master plan.

Need for Education Cited

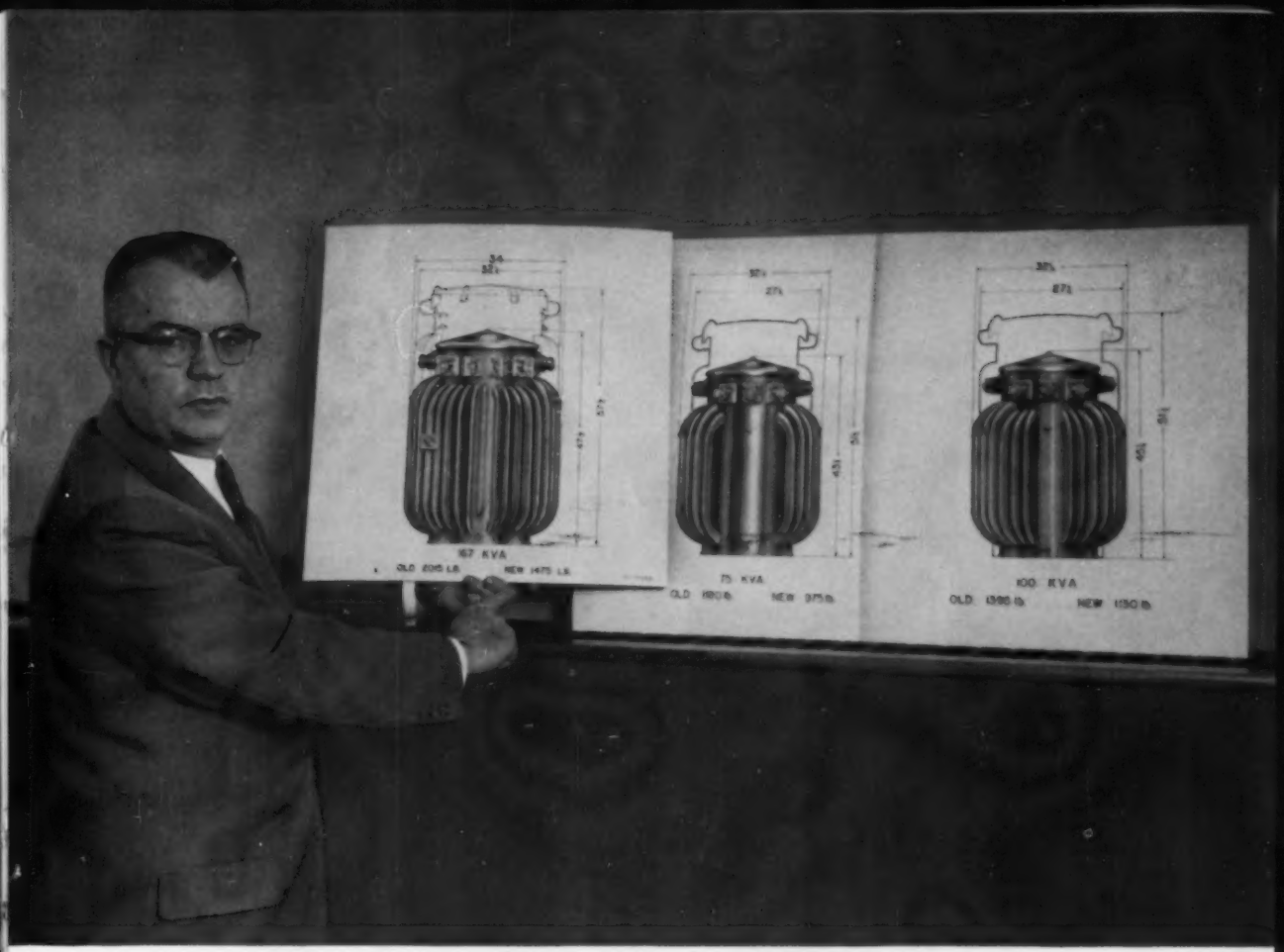
At the tree conference referred to earlier, Sealy told the group that the future of this problem lay in education of the public to the utility facts of life.

He said: "In a very real and true sense the expenses of a public utility are expenses of the public. In the same sense many of the goals of the utility and the public are inseparable. One cannot prosper without the other prospering.

"In our company we are educating our employees in the art of proper tree trimming techniques—in the proper manner to obtain tree trimming permission from private owners —in a multitude of matters which bear on this basic problem.

"We are trying to educate the public at large in the field of proper tree selection and use.

"Thus far we have made some progress in our efforts to achieve coordination of our installations with trees both publicly and privately owned. We have come a little closer to the communities we serve and the people we serve through our work in this field. While we haven't got this problem whipped, I feel that we have a start on it."



W. L. McKeithan, Section Manager, Distribution Transformer Engineering, reveals this

FACT: New pole-type units have low weight where it counts

WEIGHT REDUCTION IN HIGHER RATED TRANSFORMERS			
	75 kva 2400v	100 kva 2400v	167 kva 2400v
Old Weight	1180	1395	2015
New Weight	975	1130	1475
Per Cent Reduction	**17%**	**19%**	**26%**

The new Westinghouse pole-type distribution transformers—75, 100, 167 kva—have been drastically reduced in weight. The 167-kva unit now permits direct pole mounting—and conforms to EEI-NEMA 6th Report Standards. This means easier installation and, quite often, saves change-out to a larger, more expensive pole. Example: 167 kva, 7620 to 120/240 . . . reduced from 2600 pounds to 1515 pounds.

Get more for your transformer dollar—and simplify operating problems—with the new Westinghouse designs.

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Call The Man With The Facts, your Westinghouse Sales Engineer. Or write direct to Westinghouse Electric Corporation, Box 868, Pittsburgh 30, Pennsylvania. J-70740

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New Performance Standards

FACT—Type 44 Recorder has new, iron-core measuring mechanisms which develop twice the torque of previous designs. This provides faster response, higher fidelity under all operating and load conditions.

Ease of Use and Service

FACT—all parts fully accessible from front of recorder, a particular advantage in flush switchboard mounting.

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FACT—recorder has highest ratio of scale width to panel area, is attractive in appearance.

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FACT—extremely high overload capacity reduces danger of burnouts, promotes longer life. All mechanisms self-shielded against stray magnetic fields.

Economy

FACT—long charts and large ink capacity permit operation for greater unattended periods.

Increased Availability

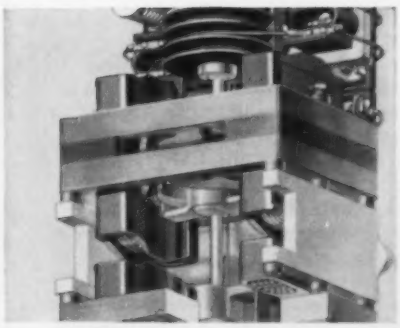
FACT—carefully coordinated, flexible design permits use of a few basic mechanisms for most applications. These are kept in stock to facilitate prompt delivery. Three kinds . . . flush mounted, projection mounted, or portable . . . available to handle watts, vars, a-c voltage and current, d-c voltage and current, frequency and power factor.

FOR MORE FACTS: CALL *The Man With The Facts* . . . your Westinghouse sales engineer. Or, get your copy of the facts booklet, B-5779, by writing directly to Westinghouse Electric Corporation, 3 Gateway Center, P. O. Box 868, Pittsburgh 30, Pennsylvania.

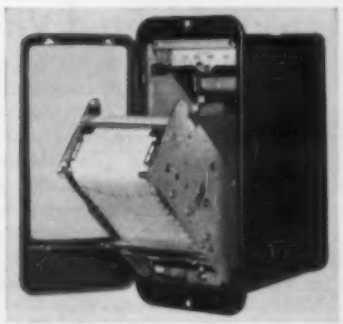
*As determined by a user survey of engineers and operating men in all industries.

J-40479

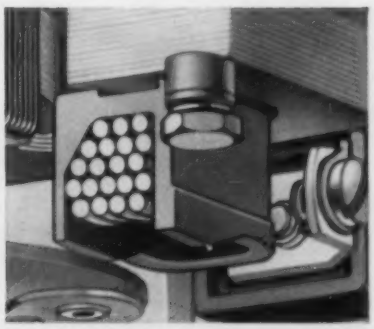
YOU CAN BE SURE... IF IT'S Westinghouse



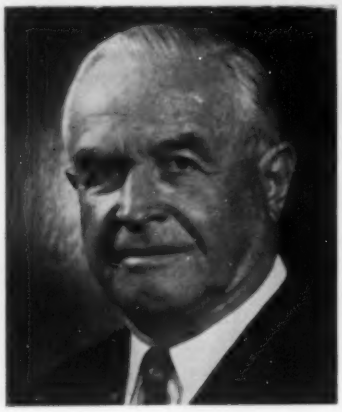
Reliable Recording—high-torque mechanism designs assure accurate, dependable recording. Performance is well within the requirements of ASA Specification No. C 39.2 for recording instruments of the 1% accuracy class.



Convenient—all parts fully accessible from front of recorder, a distinct advantage in flush switchboard mounting. All moving elements are of unit construction, can be removed without disturbing the field circuit.



Protection—extremely high overload capacity is designed into these instruments. For example, improved insulation, conductors, and connections make it possible for the a-c current circuits to carry 100 times rated current for short overloads.



J. B. BLACK

N. R. SUTHERLAND

R. H. GERDES

PG&E Makes Top Executive Changes

Pacific Gas & Electric Co will make several changes in its top management, effective June 1. James B. Black, president since 1935, will become chairman of the board. Norman R. Sutherland, vice president and general manager, will assume the presidency. He will continue to be the general manager of the company. Robert H. Gerdes, vice president and general counsel, will be elevated to executive vice president and general counsel.

As chairman of the board, Black will occupy a position that has not been filled since 1908, following the company's early period of organization. In his new capacity, he will have an active supervisory role in the company's affairs. On June 1 he will have completed 43 years' service with PG&E and a predecessor company. He has been a director 25 years and president 20 years. He began his career as a $75-a-month service inspector in San Francisco for the Great Western Power Co after graduating as a mechanical engineer from the University of California.

He was made Great Western's general manager in 1922 and a year later, at the age of 33, he became vice president and general manager. He rose to the presidency of PG&E at the age of 45.

Sutherland went to work 42 years ago as a gas lamp lighter after school hours. By 1923 he had risen to the position of commercial manager of the company. In 1945 he was appointed manager of the San Francisco Division, and two years later returned to the general office as vice president in charge of sales. In 1948 Sutherland advanced again to vice president and assistant general manager. On Aug. 1, 1950 he became vice president and general manager and in 1952 was elected a director.

Gerdes was graduated from the University of California in 1926 and from its law school in 1928. He entered private law practice and in 1929 was first employed by PG&E as assistant to the general counsel. He returned to private practice in 1935, but in 1944 rejoined the company's legal staff as assistant general counsel. He became general counsel in 1945 and was elected vice president and general counsel and a director in 1953.

L. B. CAPPA

Cappa Appointed Vice President

Lawrence B. Cappa has been elected division vice president for the Dixon area of the Public Service Co Division of the Commonwealth Edison Co. He succeeds R. E. Wahler, who has relinquished his duties for reasons of health.

Cappa, after graduating as an electrical engineer from the University of Wisconsin in 1929, became a student engineer with Edison. Later he was assigned to the engineering department in the Northern Division. From 1932 to 1936 he was member of the customer service department. For several years he was a power sales engineer. In 1940 he was appointed district superintendent at Park Ridge where he remained five years. He was then transferred to Joliet as division service manager.

In 1951 he was appointed assistant to the division vice president at Joliet. One year later he became assistant to the vice president at Dixon.

This Manson Tape is still good —after 28 years!

Mr. C. T. Warren, professional Electrical Engineer of Orange, Texas, has always recommended Manson Friction Tape to his maintenance and construction

crews. Recently he sent us two partially used rolls of Manson which have been in his tool box since 1927.

The photo above, of one of the original rolls, shows this result: *the tape, manufactured 28 years ago, still retains its tackiness and most of its original tensile strength.*

Manson Friction Tape is made of a closely woven cotton fabric, into which has been frictioned only new, naturally tacky rubber compounded with the best chemical ingredients. It is mechanically strong...durable and long-lasting...adheres firmly. Manson breaking strength is over 50 pounds per inch of width, compared to the ASTM requirement of 40 pounds.

Used with Okonite and Okolite Rubber Tapes, Manson makes splices that will be tight and waterproof far longer than ordinary tapes. Write for Okonite Splicing Instruction Folder 1089.

...when you splice with:

AVAILABLE THROUGH AUTHORIZED DISTRIBUTORS ONLY

3172

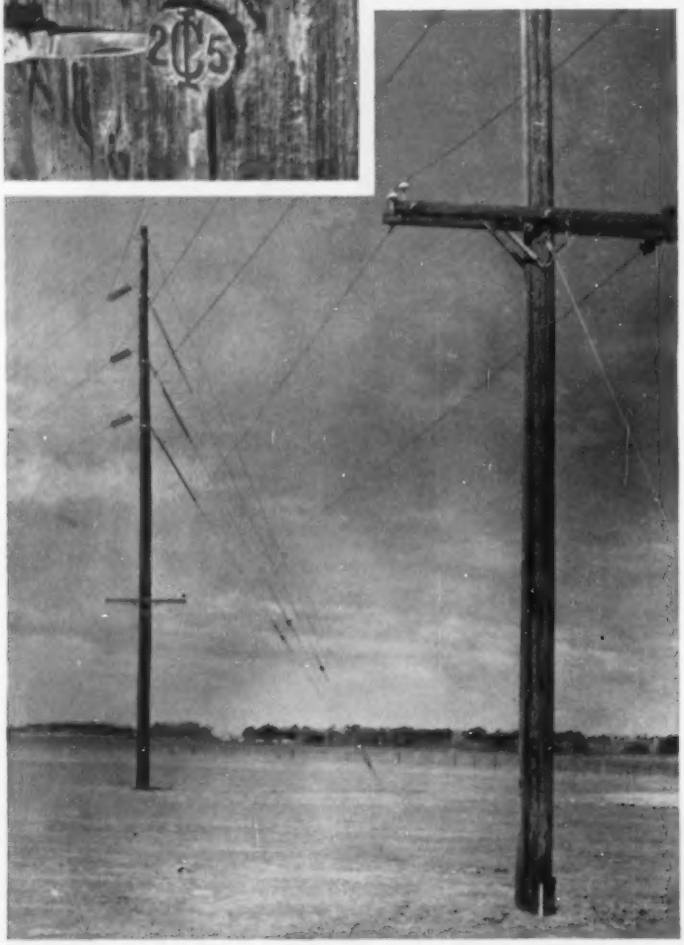
Made by
THE OKONITE COMPANY
PASSAIC NEW JERSEY
SINCE 1878

SPECIALISTS IN ELECTRICAL WIRES, CABLES AND SPLICING MATERIALS FOR 75 YEARS

Here's Proof of Performance...

Gulf States Utilities counts on over 30 years of service from *pressure-creosoted* poles

• One of the many poles marked with a 1925 dating nail, denoting 30 years of service.



Gulf States Utilities Company, serving 291 communities in southeastern Texas and south central Louisiana, uses pressure-creosoted poles exclusively in more than 10,000 miles of transmission and distribution lines.

"It would be foolish to think of putting an untreated pole in the wet, termite-infested soil of the Gulf Coast area," says John Jordan, operating supervisor. "We have come to expect over 30 years of service from a pressure-creosoted pole."

Gulf States used pressure-creosoted poles in its first inter-city line installed in 1917. Some of these poles are still in use today after removal to other locations.

"First cost of a pole is reason enough to take advantage of Creosote's ability to make poles last," says Mr. Jordan. "But a replacement is even more expensive when you consider it takes 50 to 60 man-hours to make a pole change."

With poles pressure-creosoted for adequate life, neither the utility nor its linemen have cleanliness complaints.

For best performance, from the standpoints of service and cleanliness, specify poles treated with the top-quality preservative—USS Creosote. For more information, contact our nearest Coal Chemical sales office or write directly to United States Steel Corporation, 525 William Penn Place, Pittsburgh 30, Pa.

You can obtain clean pressure-creosoted poles upon specification and with proper inspection without sacrificing pole service life.

SEE THE UNITED STATES STEEL HOUR. A full-hour TV program presented every other week by United States Steel. Consult local newspaper for time and station.

USS CREOSOTE

UNITED STATES STEEL

D. C. LUCE

Luce Slated for Honorary DEng Degree

Donald C. Luce, president of Public Service Electric & Gas Co and Public Service Coordinated Transport since 1954, will receive the honorary degree of Doctor of Engineering at the 38th commencement exercises on June 9 of Newark College of Engineering, according to an announcement by Robert W. Van Houten, NCE president.

After graduating from Lehigh University in 1924 with a degree in electrical engineering, he went to work with PSG&E as a cadet engineer. In 1936 he was promoted to general superintendent of electric generation. He then successively served as general manager of the electric department, vice president in charge of electric operation, and vice president in charge of combined operations. He was made president of the company in 1954.

PERSONAL BRIEFS

Charles E. Plamondon has been made generation and substation engineer of the Quebec Power Co . . . British Columbia Power Commission has appointed **Garth Griffiths** to the newly-created post of assistant to the general manager and chief engineer. Griffiths' old post, distribution superintendent, will be given to **J. Norman Olsen,** manager of the Comox Valley and Campbell River Power Districts.

The Executive Committee of the Better Light Better Sight Bureau has announced the following appointments: **James C. Forbes,** manager of market development, large lamp department, General Electric Lamp Division, replacing **W. H. Robinson, Jr;** and **C. A. Burton,** general sales manager Lighting Division, Sylvania Electric Products, Inc, replacing **B. K. Wickstrum.**

J. B. Ragan, Jr, supervisor of the South Carolina Public Service Authority's steam plant, has resigned.

Salt River Project Agricultural Improvement & Power District has advanced **C. V. Watters** from assistant planning engineer to supervising engineer of the planning and statistical division in the engineering department.

Glen R. Key, manager of the Grand River Dam Authority, has turned in his resignation to Oklahoma Gov Raymond Gary.

Lester Ginsburg, vice president and director of the Electric Bond & Share Co and a director of the American Foreign Power Co, has been elected director of Ebasco Services Inc, replacing **Curtis E. Calder** who died recently.

M. E. Noyes, manager of electrical industry sales for Aluminum Co of America, has retired after 42 years as an Alcoa employee.

Fred C. Eggerstedt, Jr, has been elected an assistant vice president of the Long Island Lighting Co . . . **Francis A. Keane,** assistant comptroller of Public Service Electric & Gas Co, has been named assistant to the president . . . Niagara Mohawk Power Corp has appointed **Thomas W. Ryan,** formerly director of safety for New York State, security officer.

Westinghouse Electric Corp has made the following appointments: **Robert Wagner** to be sales manager of distribution equipment in the Transformer Division; **H. E. Nason** to become Chicago district engineering manager; and **Richard D. Borgstadt** to be made application engineering manager of company's hydraulic drives department.

Frank L. Reinmann, manager of electric production at Michigan City for the Northern Indiana Public Service Co, will direct operation of the new Dean H. Mitchell generating station at Gary, Ind., in addition to his present duties . . . **Robert H. Short,** director of public relations and information for the Eugene, Ore., Water & Electric Board the past two years, has joined the public relations department of the Portland General Electric Co.

Oklahoma Gas & Electric Co has transferred **Leo Cahill,** chief engineer for the Arbuckle generating station, to the Riverbank plant at Muskogee, which, when the present construction is completed, will be the second largest power plant on the OG&E system.

OBITUARY

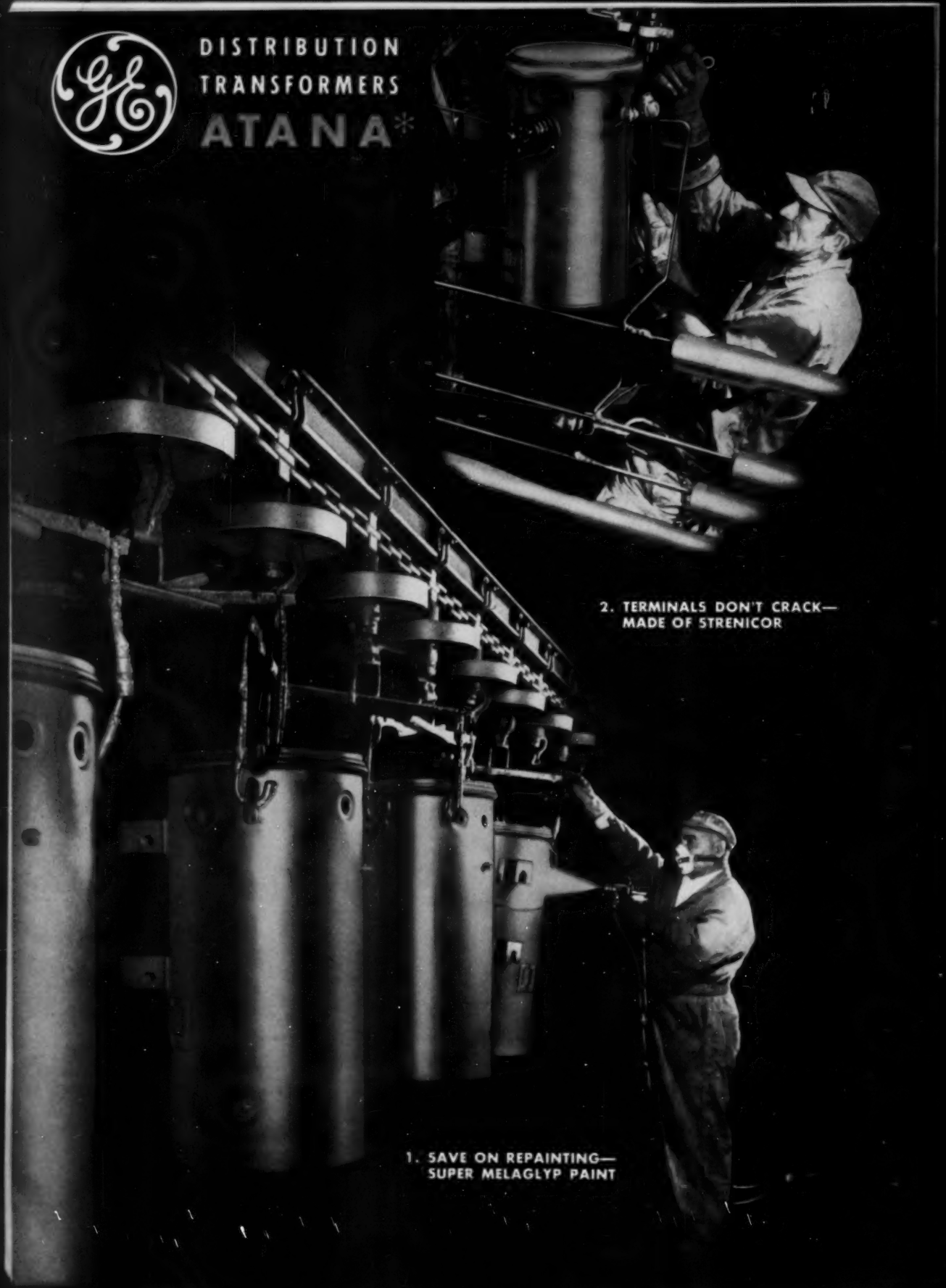
Kenneth R. MacKinnon, 67, vice president of the American & Foreign Power Co and president of the Ebasco International Corp, died in New York City on April 27. He had been associated with Electric Bond & Share Company since World War I. He started with Nebraska Power Co in 1918.

Harry W. Finnell, Jr, Pacific Coast sales manager of the Phelps Dodge Copper Products Corp, died on April 21 in Pasadena, Calif.

Raphael Gantz, 36, superintendent of gas turbine production at Westinghouse Electric Corp, Chester, Pa., died on April 23.

Earnest MacMorris, 76, retired assistant treasurer of the United Gas Improvement Co, died in Philadelphia on April 26. He had been with the utility for 54 years before his retirement last January.

DISTRIBUTION
TRANSFORMERS
ATANA*



2. TERMINALS DON'T CRACK—
MADE OF STRENICOR

1. SAVE ON REPAINTING—
SUPER MELAGLYP PAINT

3. GASKETS ARE REUSABLE—
MADE OF NITRILE

4. EASY TO OPEN—
ONE-PIECE COVER BAND

Picture-list of ways to spend

LESS MONEY FOR MAINTENANCE

Figure it out for yourself. With the large number of distribution transformers on your lines, a little money saved on each adds up. Here are four ways that General Electric transformers help you spend less money on maintenance:

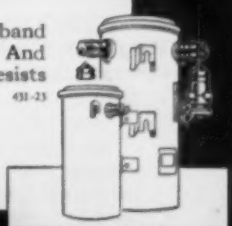
Save up to 2 repaintings. By actual tests, G.E.'s new Super Melaglyp averages 50% longer life than the best finish previously used. Longer paint life means you save one, perhaps two, repaintings.

Terminals that won't crack. Since the terminal clamps are made of Strenicor, a special alloy that resists season cracking, they're practically immune to failure.

No need for new gaskets. All tank openings on G-E transformers are sealed with *reusable* nitrile rubber gaskets. They don't have to be scraped off and can be used again and again.

Easy to open. The one-piece cover band comes off with only a screwdriver. And it's made of stainless steel which resists corrosion and maintains a tight seal. 431-23

*ATANA. Since only G.E. gives you all these money-in-the-bank features, it should be obvious that *All Transformers Are Not Alike.* General Electric Company, Schenectady 5, New York.



CONVENTIONAL — SELF PROTECTED
take your choice
General Electric makes both

Progress Is Our Most Important Product

GENERAL ELECTRIC

THESE ARE FOG-TYPE SUSPENSION INSULATOR PORCELAINS

Thirty years ago the Lapp Fog-Type suspension insulator was designed. It is the still-vital ancestor of hundreds of designs built by Lapp on the same principle of exposed multiple short petticoats for contamination duty.

During the years before, and since, this design was first used, dozens of "new ideas" for the handling of dirt conditions have been offered—and withdrawn. Among them all, the Lapp Fog-Type unit is the only design which has won wide acceptance, and has survived without serious challenge for so long a period.

What makes the difference? The fact is that most insulator design has been seriously limited by manufacturing expediency. Line operating requirements have always had to be compromised by production facility and proficiency. Seldom has the consideration of "this design will do the best insulating job" been as important as "this design is feasible of manufacture."

At Lapp, it's different. Born of Lapp's long record of production of "special porcelains" of many sizes and shapes . . . of many electrical and mechanical requirements . . . there has here developed a mastery of a variety of production and control techniques unduplicated in the ceramic industry. Less than elsewhere, are Lapp designers limited by production restrictions as to shape, size and proportion of porcelain parts, or mechanical assembly.

The Lapp Fog-Type suspension unit, and subsequent Line Post and Station Post designs, were based solely on service requirements. Lapp facilities were available for their manufacture on an efficient routine-production basis. For 30 years they have been proving their merit. Like all Lapp line insulators, and Lapp porcelain components, they offer an extra margin of operating security, long life, low upkeep.

Lapp Insulator Co., Inc., Le Roy, N. Y.

Lapp

MEETINGS CALENDAR

An extended list of coming meetings appears in the last issue of each month.

MAY

***EDISON ELECTRIC INSTITUTE**—Prime Movers Committee, Biltmore Hotel, Los Angeles, May 9-10; Accident Prevention Committee, Pfister Hotel, Milwaukee, Wis., May 9-10; Commercial Electric Cooking Conference, Sheraton Hotel, Chicago, May 10; Electrical Equipment Committee, Rice Hotel, Houston, Tex., May 16-17; Industrial Relations Committee jointly with Personnel Administration Section, Southeastern Electric Exchange, Netherlands Plaza Hotel, Cincinnati, May 19-20; Dealer Coordination Workshop, Webster Hall Hotel, Pittsburgh, Pa., May 19-20; Sales Personnel and Training Committee, EEI Headquarters, New York, May 26-27.

NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION—Business Development Section, Hotel Utah, Salt Lake City, May 9-11.

ELECTRIC COMPANIES ADVERTISING PROGRAM—Copy Group, Hotel Sheraton, Chicago, May 10.

***AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS**—Electric Heating Conference, La Salle Hotel, Chicago, May 10-11.

PACIFIC COAST ELECTRICAL ASSOCIATION—Annual Convention, Palace Hotel, San Francisco, May 11-13.

PUBLIC UTILITIES ADVERTISING ASSOCIATION—34th Convention, Sheraton Hotel, Chicago, May 11-13.

PENNSYLVANIA ELECTRIC ASSOCIATION—Spring Meeting, Systems Operation Committee, Skytop Lodge, Skytop, Pa., May 12-13; Spring Meeting, Electrical Equipment Committee, Hotel Roosevelt, Pittsburgh, May 19-20; 1955 Annual Industrial Sales Conference, Bedford Springs Hotel, Bedford, Pa., May 19-20; Annual Accounting Conference, William Penn Hotel, Pittsburgh, May 23-24; Spring Meeting, Relay Committee, Abraham Lincoln Hotel, Reading, Pa., May 26-27.

NEW YORK STATE SOCIETY OF PROFESSIONAL ENGINEERS—Annual Convention, Commodore Hotel, New York, May 12-14.

***INDUSTRIAL HEATING EQUIPMENT ASSOCIATION, INC.**—Spring Meeting, Homestead Hotel, Hot Springs, Va., May 15-18.

NATIONAL TELEMETERING CONFERENCE-EXHIBIT—Sponsored jointly by the Institute of Radio Engineers, American Institute of Electrical Engineers, Institute of Aeronautical Sciences and Instrument Society of America, Hotel Morrison, Chicago, May 18-20.

NORTHWEST PUBLIC POWER ASSOCIATION—Engineering and Operations Section, Monticello Hotel, Longview, Washington, May 19-20.

INTERSTATE POWER CLUB—General Electric Co., Bridgeport, Conn., May 20.

NATIONAL ASSOCIATION OF ELECTRICAL DISTRIBUTORS—47th Annual Convention, Conrad Hilton Hotel, Chicago, May 22-25.

***ATOMIC INDUSTRIAL FORUM**—May Meeting, Waldorf-Astoria Hotel, New York, May 23-24.

NORTH CENTRAL ELECTRICAL ASSOCIATION—Accounting Committee, Fergus Falls, Minn., May 27-28.

JUNE

***AMERICAN SOCIETY OF MECHANICAL ENGINEERS**—Oil and Gas Power Conference, Statler Hotel, Washington, D. C., June 5-10; ASME-IME Comb. Conference, MIT, Boston, June 15-17; Applied Mechanics Conference, Rensselaer Hotel, Troy, New York, June 16-18; Diamond Jubilee Semi-Annual Meeting, Statler Hotel, Boston, June 19-23.

AMERICAN WELDING SOCIETY—Spring Meeting and Welding Show, Hotel Muehlebach, Kansas City, Mo., June 7-10.

ILLUMINATING ENGINEERING SOCIETY—Northeastern Regional Conference, Ft. William Henry, Lake George, N. Y., June 10-11.

ELECTRIC COMPANIES ADVERTISING PROGRAM—Management Group, Statler Hotel, Los Angeles, Calif., June 12.

EDISON ELECTRIC INSTITUTE—23rd Annual Convention, Los Angeles, Calif., June 13-16.

AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS—Magnetics Conference, Hotel William Penn, Pittsburgh, June 14-16; Summer General Meeting, New Ocean House, Swampscott, Mass., June 27-July 1.

AMERICAN SOCIETY FOR ENGINEERING EDUCATION—63rd Annual Meeting, Pennsylvania State University, State College, Pa., June 20-24.

NORTHWEST ELECTRIC LIGHT & POWER ASSOCIATION—Accounting and Business Practice Section, Vancouver Hotel, Vancouver, B. C., June 22-24.

WISCONSIN UTILITIES ASSOCIATION—Accounting Section, Dell View Hotel, Lake Delton, Wis., June 26-28.

*Additions this week.

SEE Engineers Meet . . .

(*Continued from page* 27)

185F demineralized water with 100 ppm trisodium phosphate through the system for eight hours. The system then was drained, flushed, and refilled with condensate. Silica in the steam subsequently used to blow out lines was only 3 ppm, compared with 15 ppm on previous units.

Chemical cleaning and flushing of the boiler and subsequent steps then proceeded according to more usual practices. There was no need to restrict initial loading, said Ristroph, and the turbine carried full load within 48 hours.

Graphitization at the welds of alloy steel steam lines has proved troublesome in high temperature plants, reported R. S. Hardigree, Southern Services. Investigations disclosed that proper preheating during welding, and stress-relieving after, reduce the hazard in piping. But they also disclosed critical conditions in castings, particularly where over 1½ lb aluminum per ton of steel had been used to de-oxidize. Hardigree described new welding techniques for repairing defective sections and for installing new work.

Cooling towers for condenser water can extend condenser tube life by eliminating corrosive gases and foreign objects and facilitating chemical treatment, said W. B. Gurney, Gulf States. And the water returned to condensers is generally cooler than water from other sources in the South. Disadvantages are cost of space occupied, frequent operating attention, and increased auxiliary power demands.

Hydroelectric development proposed for the Coosa and Warrior Rivers was described by F. C. Weiss, Alabama Power Co. He said that the Coosa project represents the first time in history where a private company has planned development with private capital of a complete river for flood control, navigation and power.

K. M. Robinson, R. C. Setterstrom, M. D. Duffy talk between meeting sessions

Nelpa Analyzes NW Problems

- **Utilities Warned: Develop own power supply or expire**
- **Area power supply, demand seen balanced for 5 years**
- **Heat pump tests promise a solution to space heating**

"If you don't develop your own power supply and become independent of federal power, you will be out of business in ten to 15 years."

That emphatic warning was sounded by Kinsey M. Robinson, president of Washington Water Power Co, to a group of private power engineers of the Pacific Northwest. The occasion was the engineering and operating section meeting of the Northwest Electric Light & Power Association in Spokane.

"The time is coming when all federal power will be going to public agencies through operation of the preference clause," said Robinson. "Private utilities of the Northwest face extermination if they do not develop their own power supply."

"If you are afraid of 4½ mill hydro, you better get out of business," he declared. Robinson said further that the private utilities of the Northwest must look to having steam as a base in the next ten to 12 years.

Robinson's own company hopes to begin work on Noxon Rapids (300 Mw) by mid-year and is a member of the four-company Pacific Northwest Power Co which has a permit to investigate two sites on the Snake that would develop 1,000 Mw.

Commenting on the power outlook, W. J. Mosley, Co-ordinator for the Northwest Governor's Power Committee, said power supply and demand will be about in balance for the next five years, but that about 880 Mw of new capacity in addition to the 3,600 Mw now under construction will be needed to meet 1960-61 loads. By 1963-64, the requirements will have risen to 2,560 Mw.

A willingness has been expressed to develop 36 projects that could add 6,700 Mw by 1963-64. But, for various reasons, the list boils down to 20 projects that might provide in excess of 3,000 Mw for the 1960-61 situation. Of the 20, there are only five that are presently advancing on a schedule that would help to remedy the 1960-61 requirement. These five would produce 580 Mw, leaving a further requirement of 300 Mw. If as little as 15% of the remaining proposals can be cleared, said Mosley, that could take care of the 1960-61 situation for power supply-demand.

Fish and wildlife problems enter into practically all of the sizable projects proposed, but it is hoped that these and other problems may be resolved by co-operative studies, research, and efforts now under way by all interests involved.

Heat Pump Test Results

Electric space heating, a perennial subject of dissension at these Northwest meetings, developed one conclusion and one new approach to the problem. Portland General Electric Co, after a full year's test of two package-type heat pumps using supplemental resistance heating, found that summer cooling load was practically negligible, less than 1%, and annual load factor was only about 12%. Under these conditions the company does not feel that this is the answer to its problems.

A. B. Martin, of Washington Water Power, came up with a new approach to the problem. He proposes use of a small package heat pump that will handle base heating requirements and then automatically cut over to oil. He has seven 1½ to 2 hp heat pumps of this kind under test. These carry about 85% of the year's heating requirements and produce annual load factor of about 65%. Annual heating bill is 10 to 20% less than for oil alone. Combined first cost of oil furnace and heat pump is much less than for a heat pump sized to do the whole job.

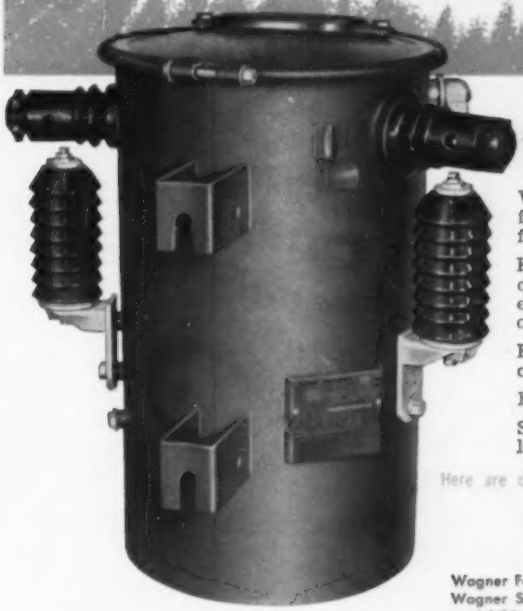
Manufacturers Hesitate

The load produced is very desirable for the utility and so far no bugs have developed. However, Martin said manufacturers have shown little enthusiasm in building such a heat pump, although the scheme could be the answer for the whole northern half of the nation.

Another subject of general interest was how economically to convert small hydro plants in the area of 2,000 kw to automatic or semi-automatic operation. A solution must be found or many of these plants will have to be shut down because of high operating costs. Some short-cut methods have been tried, but the problem remains unanswered.

The section meeting was presided over by M. D. Duffy, Pacific Power & Light Co.

Make faster, easier, safer connections with Wagner FORM W Distribution Transformers



Shown above is a Wagner 10 kva 2400/4160Y—120/240 volt type HEB-1 protected distribution transformer.

HIGH VOLTAGE SIDEWALL BUSHING

Whenever you buy a Wagner Pole Type Distribution Transformer, you get a transformer with many important *extra* features.

For instance, the high voltage sidewall bushing, used in distribution transformers, 5 kv and below, that means faster, easier, safer *permanent* transformer connections for copper or aluminum conductor.

FASTER because the conductor is simply pushed into the connector and held tightly with a few turns of the knob.

EASIER because no tools are needed and...

SAFER because the knurled knob is insulated to protect the lineman from accidental shock when tightening the terminal.

Here are other EXTRA features of Wagner FORM W Distribution Transformers...

SHUR-SEAL COVER— INHIBITED OIL

Wagner Form W Transformers come with the Wagner Shur-Seal Cover and are filled with an inhibited oil. The Shur-Seal Cover makes a *positive* seal which prevents oil contamination caused by injurious "breathing" of atmospheric moisture and dust particles. The inhibited oil reduces oxidation to a minimum and retards the formation of acids and sludge which can cause rapid transformer deterioration. Together, these features add years to the life of Wagner Form W Transformers.

LOCKED SECONDARY BUSHING

Positive position lock for both porcelain and terminal prevents loose connections on inside end of terminal studs and provides greater safety to linemen when connections are being made.

Write for your copy of Bulletin TU-180. It gives complete information on Wagner Distribution Transformers.

WAGNER ELECTRIC CORPORATION
6456 PLYMOUTH AVE., ST. LOUIS 14, MO., U.S.A.

BRANCHES AND DISTRIBUTORS IN ALL PRINCIPAL CITIES

ELECTRIC MOTORS
TRANSFORMERS
INDUSTRIAL BRAKES
AUTOMOTIVE BRAKE SYSTEMS— AIR AND HYDRAULIC

T55-3

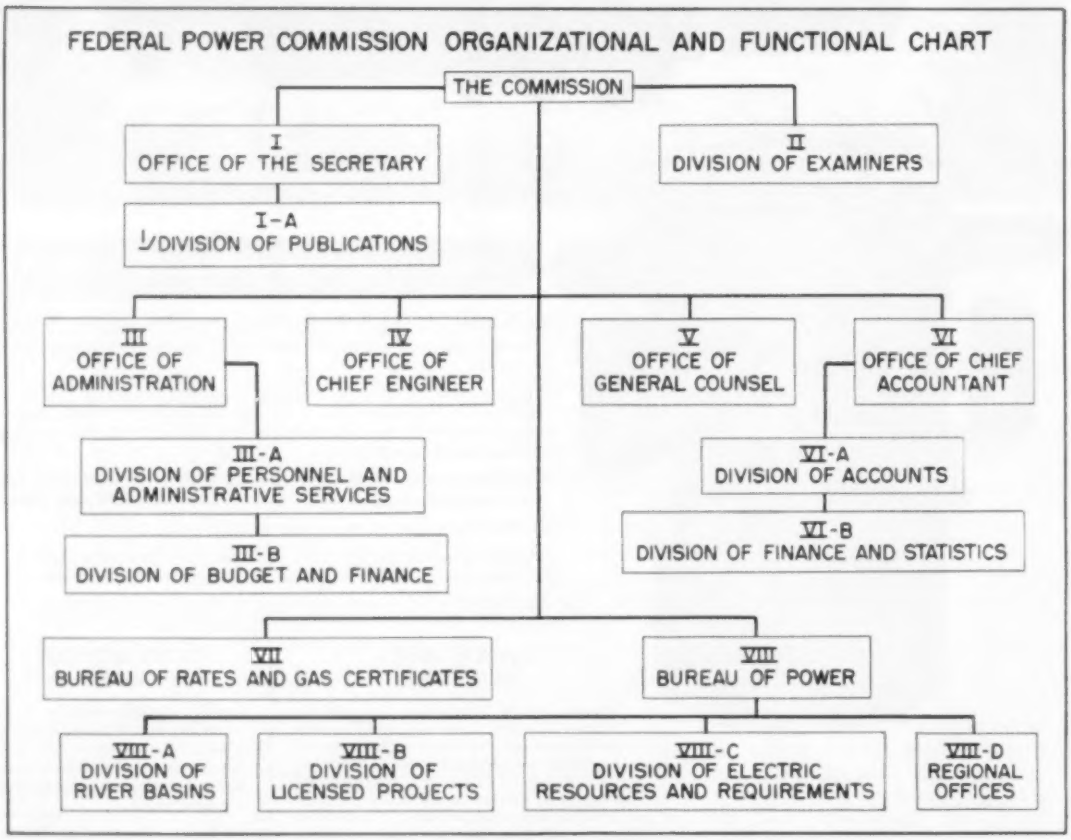
Yellowtail Partnership Planned

Pacific Power & Light Co and Montana Power Co are conferring on possible partnership development with the federal government of the Yellowtail hydroelectric project on the Big Horn River.

This was reported by PP&L Pres Paul B. McKee at Portland, Ore., headquarters where he confirmed that Under Secretary of the Department of Interior Clarence A. Davis had asked the two utilities to signify their willingness to participate in the $120-million Yellowtail project so adequate data can be submitted to Congress for proper authorization. Preliminary studies indicate the two companies would underwrite the power and transmission phases for about $50 million.

The Yellowtail site, located in a deep chasm of the Big Horn in southern Montana and just north of the Wyoming border, is involved in plans for the Hardin irrigation unit water supply.

The powerhouse could develop an estimated 200,000 kw to 250,000 kw on a seasonal basis and 120,000 kw firm. McKee indicated steam facilities might be built to firm up the seasonal hydro generation. The PP&L executive revealed his company has been hunting for a new power source to meet demands and future growth in the Wyoming markets it acquired last year by merger with Mountain States Power Co. PP&L's northernmost system lines in north central Wyoming are just south of the Montana-Wyoming border near the Yellowtail site. Montana Power's southernmost lines are south of Billings and about equal distance from the site as are the PP&L terminals.



Federal Power Commission Is Reorganized

The Federal Power Commission has completed reorganization and streamlining of its functions. (See above chart). It has abolished its Bureau of Law and made other changes designed to speed up and co-ordinate operations.

One of the biggest jobs in years was dumped into the commission's lap last year by the Supreme Court decision in the Phillips Petroleum Case. Under that ruling, 4,500 to 5,000 natural gas producers selling gas which winds up in interstate commerce must be certified, and their rates set, by the commission. Since Congress refused to grant FPC an increase in appropriations to take care of the new work load, a reorganization for greater efficiency became necessary.

"They're safe to perch on . . . and

Pole Star®

offers a choice of neoprene or porcelain protective caps for high voltage cover-mounted bushings."

Protected Pole Star transformers are available in all single phase sizes from 3 through 100 Kva, 480 through 14,400 volts. Conventional Pole Stars, from 3 through 500 Kva, 480 through 67,000 volts.

Like the wise old bird says, his furred and feathered friends can romp around Pole Star cap-protected, high voltage, cover-mounted bushings without worrying about coming in contact with live parts. Many users of Pole Star transformers specify this feature — to protect wildlife, as well as to eliminate the service interruptions and damage that birds and animals sometimes cause. The most common use of caps is on Protected Pole Stars, Pennsylvania's CSP transformers.

To satisfy the preference of all customers requesting this protection, Pole Star now offers a *choice* of two different protective caps — either **neoprene or porcelain.** Caps can be furnished for the high voltage cover-mounted bushings of any Pole Star transformer. The caps are easily installed by simply sliding them over the top of the high voltage cover bushing.

Offering a *choice* of material in an *optional* feature typifies Pennsylvania's concern with every detail of transformer application. The "optional option" of protective caps is available, at a nominal addition in cost, with either conventional or Protected Pole Stars.

Distribution Sales Department

PENNSYLVANIA TRANSFORMER COMPANY

A McGraw Electric Company Division

CANONSBURG • PENNSYLVANIA

Repeat Requisitions Save Time and Effort

R. C. WENZ, General Purchasing Agent, Duquesne Light Co, Pittsburgh, Pa.

Repeat requisitions save a lot of paper work because each is used eight times. In moving between the general stores and general purchasing departments, the repeat requisition used by Duquesne Light Co collects information which speeds and simplifies ordering by the stock control man, pricing and purchasing by the buyer, and order writing.

Advantages of this form include:

1. Less paper work because each requisition is used eight times.

2. A better knowledge of the delivery performance of each vendor.

3. Easier selection of a vendor because the speed with which the material must be obtained is signaled.

4. Reception by the store keeper of all information submitted by the vendors concerning availability and other market conditions.

5. Records of the performance of both the general purchasing and general stores departments since the time allowed for delivery (controlled by the stores controlman) and the time required to process the order (the buyer's job) are supplied.

The repeat requisition serves as a historical record of all previous purchases (regardless of delivery location) and of all previous prices as each card is kept on file after the last (eighth) transaction is completed.

In use the stockman initiates a purchase (when the order point is reached) by entering quantities and date wanted. Moved on to the purchasing department, the requisition is used by the buyer to price products and select vendors. Order writing is the next step.

After a transaction has been completed, the requisition is returned to the stores department. On the basis of average movement, a typical requisition circulates about two years.

Five Advantages

1. PROVIDES A CHECK- review of dates shows efficiency of both general stores and general purchasing departments

Dates entered by stock controlman when he sends requisition to "purchasing"-- these vary with availability and use

Dates entered by "purchasing"--gives time required to process order

2. EXPEDITES PRICING AND VENDOR SELECTION

✓IF-price is covered by contract, buyer merely contacts vendor by telephone for shipping promise

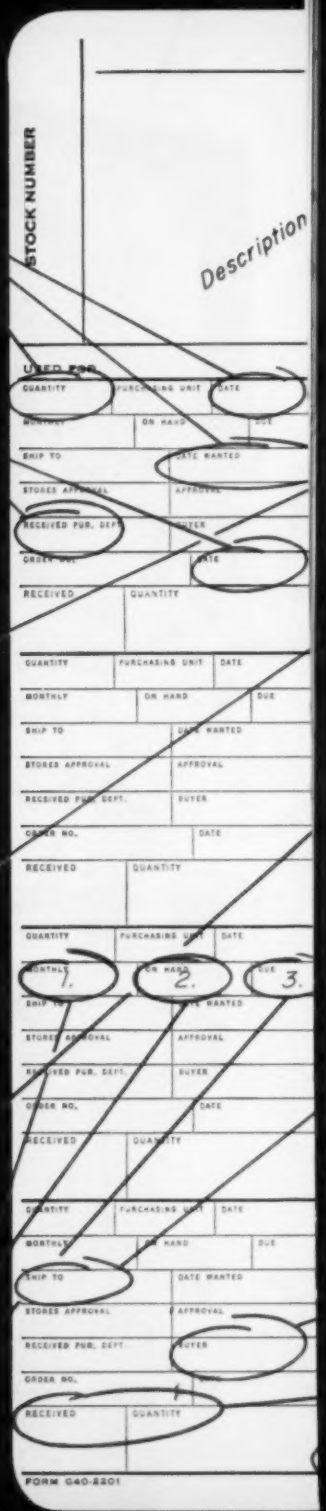
or

✓IF-item is non-contract, this automatically signals the buyer that this item must go out for inquiry to approved vendors (above)

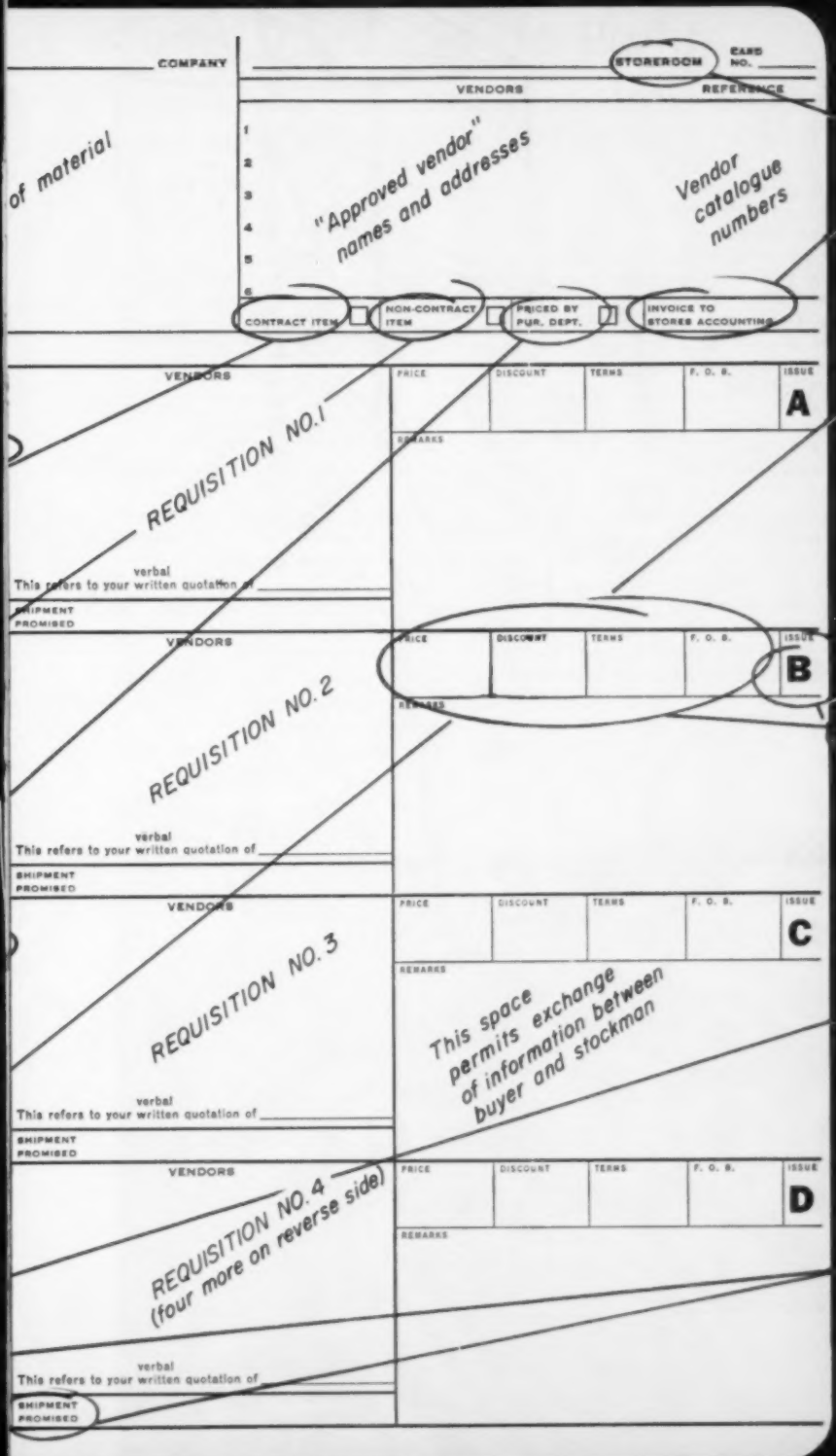
or

✓IF-item is non-contract, but can be priced as readily as contract items (in this group are items priced by catalogue)- only current shipping promise is needed.

1. Monthly consumption
2. Quantity on hand
3. Quantity on order
This information helps buyer exercise judgment in selecting vendors



# of Duquesne's Repeat Requisition



1. SIMPLIFIES ORDER WRITING
Indicates base storeroom

Placed on requisition for guidance of order writers so that this information is automatically placed on purchase order

Elaborate shipping instructions are placed on face of purchase order with rubber stamp -- number (placed here) permits order writer to select stamp for correct shipment

Must be entered by buyer before purchase order can be written

2. SPEEDS HANDLING AND FOLLOW-UP
Identifies (together with stock and card numbers) the particular transaction against which order was placed

Authority for writing purchase order -- facilitates handling of requisition because it tells record clerk which buyer handles item

3. CHECKS VENDOR PROMISE
Check on integrity of shipping promise -- space allows details of partial shipments and verbal price quotation on small orders

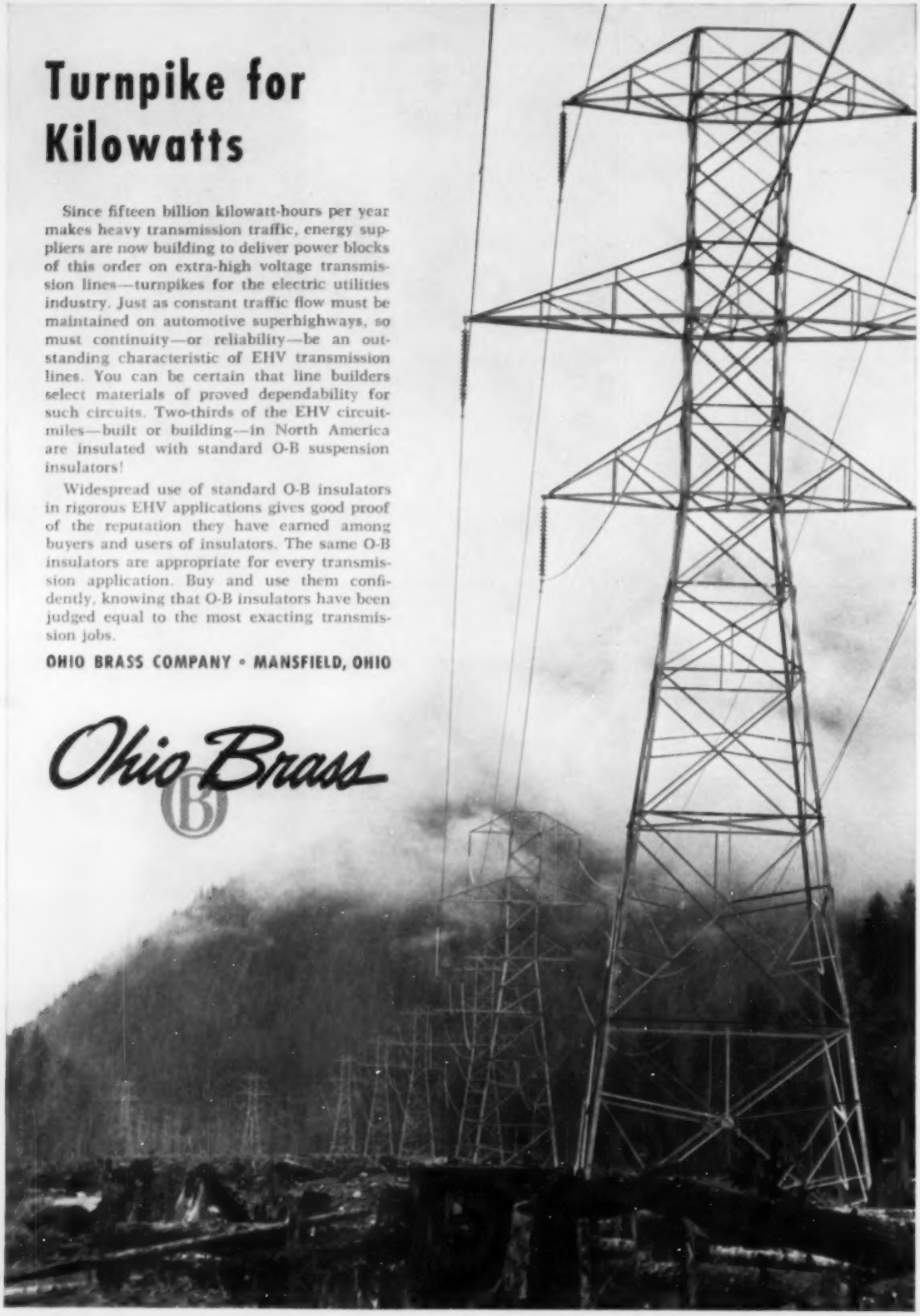
Turnpike for Kilowatts

Since fifteen billion kilowatt-hours per year makes heavy transmission traffic, energy suppliers are now building to deliver power blocks of this order on extra-high voltage transmission lines—turnpikes for the electric utilities industry. Just as constant traffic flow must be maintained on automotive superhighways, so must continuity—or reliability—be an outstanding characteristic of EHV transmission lines. You can be certain that line builders select materials of proved dependability for such circuits. Two-thirds of the EHV circuit-miles—built or building—in North America are insulated with standard O-B suspension insulators!

Widespread use of standard O-B insulators in rigorous EHV applications gives good proof of the reputation they have earned among buyers and users of insulators. The same O-B insulators are appropriate for every transmission application. Buy and use them confidently, knowing that O-B insulators have been judged equal to the most exacting transmission jobs.

OHIO BRASS COMPANY • MANSFIELD, OHIO

Ohio Brass



Turn "Dog Days" to Profits

Union Electric invites food service prospects to a cooking show . . . and they flock in, even during the heat of the day

E. GLENN BOVERIE, Commercial Cooking Division, Union Electric Co of Missouri, St. Louis

Looking for ways to turn those sleepy summer afternoons coming up into something profitable?

Union Electric Co of Missouri did it last year by promoting commercial electric cooking.

The company set up a series of weekly meetings with food service operators in the St. Louis area to show them the latest in commercial cooking equipment. Meetings were held throughout the summer, most of them on a weekday afternoon.

The turnout was tremendous. An affair at the company's St. Charles, Mo., store attracted 60 restaurateurs out of 71 who were invited. At the 20 sessions held in the downtown St. Louis office, attendance ranged from five to 17 at each one of them. Union Electric's commercial cooking personnel helped it along by picking up prospects in their own private automobiles and then dropping them off afterwards.

As a result of the meetings, the restaurant men learned about the new models of equipment as fast as the manufacturers brought them out. Meetings opened with a demonstration showing the characteristics of heat when applied by electricity and when applied by flame. Following this, food was prepared on a new restaurant-size electric range and demonstrations of various makes and types of equipment were given. Sometimes a promotional film, "Now I'm In Business," was shown. One meeting at Alton, Ill., was held in conjunction with the Alton Restaurant Association. Members spoke highly of the program.

Meetings were arranged and conducted by Union Electric's commercial cooking personnel. Home economists assisted with those held in the St. Louis office and with the larger ones in the outlying branch stores.

Company officials feel the shows did much to refresh and strengthen customer relations at a minimum of sales expense per prospect.

Street Lighting Film Ready for Showing

Crime and accident prevention through better street lighting is powerfully portrayed in the documentary film, "Out of Darkness" now being released for showing by General Electric Co. Main feature of GE's "More Power to America" street lighting program, the film is available on a one-time loan basis through the firm's local electric apparatus sales offices.

In releasing it, L. Byron Cherry, general manager of G.E.'s Outdoor Lighting department, pointed out that more than 90% of the nation's streets are inadequately lighted. "There is a wealth of documentary evidence in the film," he said, "which indicates there invariably is a sharp decline in assaults, robberies, vandalism and traffic accidents following the installation of modern lighting."

Overhead Infrared Lamps ➡ Chase Chill at Ice Rink

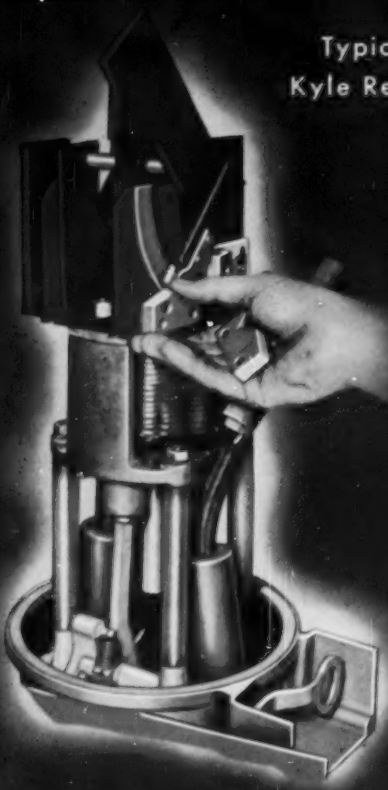
LOUIS E. ANDERSON, Industrial Heating Consultant, Department of Water & Power, Los Angeles, Calif.

Hogs and chicks aren't the only ones who thrive with infrared heat. Patrons at the Jerry Page Ice Skating Studio, Los Angeles, are finding new comfort under the over-head infrared units recently installed in the rink's spectator area.

Parents once squirmed with cold feet as they dutifully waited on their caper-cutting progeny out on the rink. Now, some of them even have been found to catch a few winks of sleep under the infrared's penetrating warmth. The new units replace a convection-type system which the management found was ineffective against a foot-chilling, cold-air blanket that hugged the floor. With the infrared heaters beamed only at the spectators, the ice on the rink is not affected.

Installation consists of four 1.25-kw Pyrex tube heaters backed by reflectors and mounted in a continuous line over the lounge at one end of the rink. For employees' comfort, an electric foot-warming pad is used under the reception desk.

Typical Procedures for Kyle Recloser Maintenance

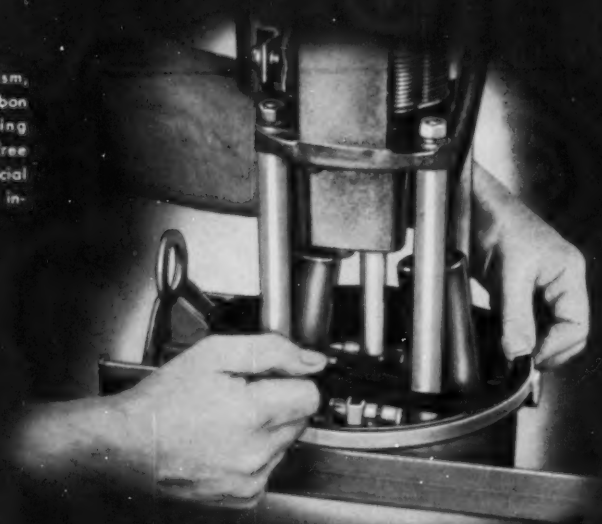


Check mechanism to see if contacts close freely, are smooth and free from carbon. L-M offers a complete contact assembly which is pre-adjusted at the factory and very easy to install.

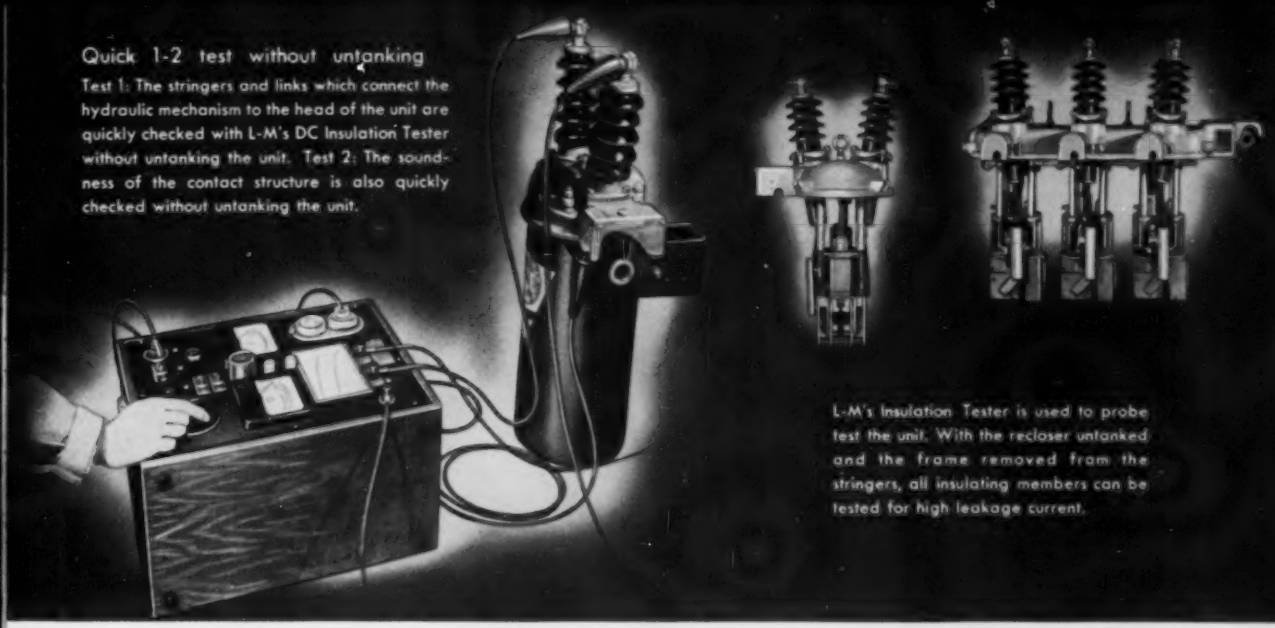
If liner shows signs of moisture such as blisters, or softness at bottom, it is an indication that the recloser may need drying out. The liner should be replaced or dried out when there are signs of moisture.

Clean tank with new oil and thoroughly wipe out carbon deposit. Refill with oil that has been hi-pot tested, whether new or reclaimed. (New oil may have absorbed moisture if the drum was left open for any length of time.)

Clean mechanism, removing all carbon traces by wiping with clean, lint-free cloth, paying special attention to all insulating parts.



Before mechanism is replaced in tank, check and install a new head gasket, if necessary, to assure a good seal against moisture.



Quick 1-2 test without untanking

Test 1: The stringers and links which connect the hydraulic mechanism to the head of the unit are quickly checked with L-M's DC Insulation Tester without untanking the unit. Test 2: The soundness of the contact structure is also quickly checked without untanking the unit.

L-M's Insulation Tester is used to probe test the unit. With the recloser untanked and the frame removed from the stringers, all insulating members can be tested for high leakage current.

Take Advantage of Longest Practical Maintenance Cycle in Kyle® Reclosers

The maintenance cycle may be one, three, or more years, depending on climatic conditions and the duty imposed on the recloser. A method is given for determining frequency and simplifying maintenance.

by **FRANK McSTAY**
Manager
Kyle Products Sales
Line Material Company

Many Kyle reclosers are still in operation after three, four, or more years without any maintenance. To assure dependable and continued operation, such reclosers should be checked. Kyle engineers recommend a program of spot checking reclosers, to determine the longest safe maintenance cycle for your operating conditions.

The length of time a recloser can be operated without maintenance depends on several factors. Collection of moisture, for example, is a result of time, loads, and climatic conditions. The collection of carbon is, of course, a result of the operating duty, i.e., the number of arc interruptions, magnitude of the current, voltage, and power factor of the fault current. These factors, involved in determining the recloser maintenance cycle, vary with each section of the country and with the operating duty imposed on the recloser. To obtain the longest practical maintenance cycle you should organize a program that meets your individual requirements.

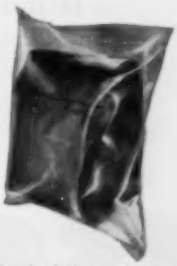
One means of making a quick insulation check, without disassembling the recloser, is with L-M's new DC Insulation Tester. This is a highly efficient, low-priced portable unit that accurately determines the condition of insulation in reclosers and other apparatus.

If you find it necessary to replace the contacts on the recloser, it is advisable to replace the complete contact assembly, because this insures obtaining the proper setting of the contacts without calibration equipment. L-M makes available a complete contact assembly which is pre-adjusted at the factory and very easy to install. All the insulation parts as well as the contact assembly are shipped in a sealed plastic bag so that they will be protected from moisture in handling and storage.

Get The Facts On Maintenance

The L-M Field Engineer can help you with your maintenance problems. Discuss them with him—you'll find his advice helpful. Detailed maintenance instruction bulletins are available for Kyle reclosers, switches and sectionalizers. A bulletin that discusses factors determining the frequency of maintenance periods and how maintenance should be done is also available. Ask your L-M Field Engineer for these bulletins or write Kyle Products Division, Line Material Company, Milwaukee 1, Wisconsin (a McGraw Electric Company Division).

Coils are vacuum-impregnated and shipped in oil-filled, sealed cans. L-M reclosers are so constructed that coils of different ampere ratings are interchangeable.



Other insulation parts as well as the contact assembly are shipped in sealed plastic bags to protect against moisture and dirt.

LINE MATERIAL Kyle® Reclosers

190-31

ROEBLING PAPER POWER CABLE WITH TELLURIUM LEAD ALLOY SHEATH

YOU WANT

- *EXTRA FATIGUE RESISTANCE,*

PLUS

- *LOWEST LONG-TIME CREEP RATE,*
- *HIGH BURSTING STRENGTH,*
- *TOP STABILITY UNDER HEAT,*
- *ABOLITION OF FREQUENT STOP JOINTS OR REINFORCED LEAD SHEATH,*
- *ABOLITION OF NEED FOR GENEROUS EXPANSION BENDS OR LARGE MANHOLES...*
- *THE DEPENDABILITY ASSURED BY OUR EXCLUSIVE MANUFACTURING, TESTING AND FIELD EXPERIENCE...*

IN SHORT,

YOU WANT

ROEBLING

Subsidiary of The Colorado Fuel and Iron Corporation

JOHN A. ROEBLING'S SONS CORPORATION, TRENTON 2, N. J. BRANCHES: ATLANTA, 934 AVON AVE. • BOSTON, 51 SLEEPER ST. • CHICAGO, 5525 W. ROOSEVELT RD. • CINCINNATI, 3253 FREDONIA AVE. • CLEVELAND, 13325 LAKEWOOD HEIGHTS BLVD. • DENVER, 4501 JACKSON ST. • DETROIT, 915 FISHER BLDG. • HOUSTON, 6216 NAVIGATION BLVD. • LOS ANGELES, 5340 E. HARBOR ST. • NEW YORK, 19 RECTOR ST. • ODESSA, TEXAS, 1920 E. 2ND ST. • PHILADELPHIA, 230 VINE ST. • SAN FRANCISCO, 1740 17TH ST. • SEATTLE, 900 1ST AVE. S. • TULSA, 321 N. CHEYENNE ST. • EXPORT SALES OFFICE, TRENTON 2, N. J.

Selling Cleanliness

"So-o-o Clean—Cook Electrically" to theme EEI's Fall range campaigns

Cleanliness will continue as top selling point in Edison Electric Institute's coordinated electric range campaign to run this fall.

Using the theme, "So-o-o Clean, Cook Electrically", the campaign, will follow up this spring's "White Gloves" effort. Sample promotional kits will be mailed May 26. Orders must be placed by June 23. The three-month campaign will start Sept. 1, with the period between the closing date for orders and start of the campaign as time designated for utilities and dealers to set up local plans.

Idea behind the coordinated campaigns is to get all elements of the industry—utilities, manufacturers, distributors, electrical leagues and dealers—to concentrate their promotional efforts on the same appliances at the same time. Thus, says EEI, greater sales can be gained through better penetration of the national market.

Indiana PS Turns Sour Cream into Sweet Sales

Indiana Public Service Co pulled a public relations and sales trick recently—with sour cream, no less.

Dairy farmers in its area have a problem of disposing their supplies of the little-used food. So, the company got together with a local dairy and Lily-Tulip Cup Corp to put on a cooking demonstration for a packed house of Lafayette, Ind., homemakers.

Using electric ranges and chafing dishes, a Lily-Tulip food consultant rolled out a variety of sour cream dishes ranging from spice cake to hamburger Stroganoff. Importance of electric cooking with its controlled heat was stressed throughout the sessions. After sampling the concoctions at show's end, the audience went home armed with a sour cream recipe book plus a new idea of how electricity and sour cream can enhance their cooking. Lily-Tulip plans to put on more of these demonstrations. Utilities interested are invited to contact the cup maker at 122 E. 42nd St., New York, N. Y.

Pittsburgh Reflector Co Photo

New Wrinkle for Corrugated Ceiling

By lighting only part of the ceiling, this effect is achieved in the lobby of Philadelphia's Blue Cross office building. It is a new illuminated ceiling said by the manufacturer to be cheaper to install and maintain than conventional types. Its corrugated vinyl covering, supported on extruded aluminum channels, is inserted and removed from bottom of ceiling instead of top, requiring but one man to do the job. Unit comes packaged and can be suspended from the ceiling itself or from existing lighting fixtures. It can be used to cover the entire ceiling or just a section as in the picture. Auxiliary spun glass acoustical baffles are available for jobs requiring sound absorption.

S & S SHORTS

Appliance Sales Up for 1st Quarter

Substantial rises in first quarter sales have been announced by three major appliance manufacturers. General Electric Co reports a 37% increase over the same period last year, Westinghouse Electric Corp 16%, and Frigidaire Division of General Motors 25%. Leaders in GE's sales for the quarter were dishwashers, up 91%; dryers up 73% and automatic washers, up 61%.

Ceiling Cable Eliminates "Shadow"

A new radiant ceiling heating cable said to eliminate "cable shadow," the faint streaking caused by chemical reaction between cable and plaster in process of curing, has been introduced by Sunwarm, Inc, and Modern Heat Cable Corp, two Kingsport, Tenn., manufacturers. Protected with a full polyvinyl chloride insulation and covered with a nylon jacket, the new cable is 30% smaller in diameter than former products.

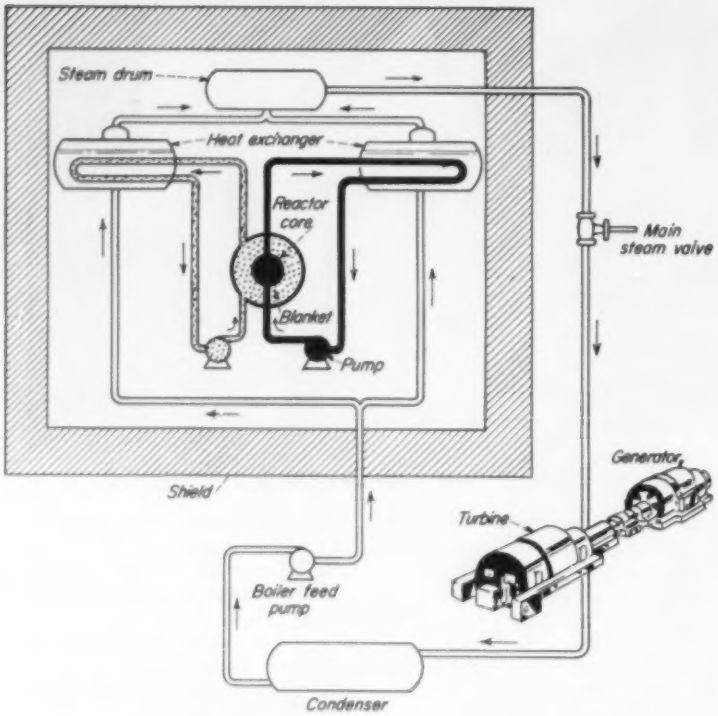
More Certified Lighting

Certified Lighting Bureaus are being started in three more areas—San Francisco, San Diego, Calif. and Cincinnati, Ohio. Bureau's program to upgrade commercial-industrial lighting now operates in six cities, the three above plus Providence, R. I., Boston, Mass., and Indianapolis, Ind.

AW Reprints Offered:

Reprints of a two-page, full-color spread on adequate wiring currently appearing in national magazines are offered by Allis-Chalmers Manufacturing Co. Suitable for local display or distribution, they may be had by writing directly to Allis-Chalmers, Milwaukee 1, Wisc.

Nuclear Equipment Suppliers Increase



Foster Wheeler Offers 100-Mw Nuclear Plant

Foster Wheeler Corp is ready to design and build, for completion by 1960-1961, an advanced type of nuclear power plant. The cost will be competitive with some present-day power station costs, according to Robert Gould, manager of the company's Nuclear Power Project.

The plant being offered will have a capability of 100,000 kw, and can be built now at an estimated cost of $21 million to the owner, Gould said. Electric costs could be as low as 6 to 9 mills per kwhr, he added. See illustration.

An aqueous homogeneous power breeder system will be used. The fertile material will be Thorium 232, which will be converted to Uranium 233 and used to refuel the reactor.

The homogeneous reactor has been favored by the Atomic Energy Commission as a "long-term" possibility. "Long-term" means ready for testing at an indefinite time beyond five years, according to AEC time formula.

Combustion Engineering to Build Nuclear Reactors

Combustion Engineering, Inc, has made an initial appropriation of $7 million for new facilities for manufacture of nuclear power equipment according to Joseph V. Santry, chairman.

Work has been started on a new building at the company's Chattanooga, Tenn, division for the production of nuclear reactors. The building will be equipped with heavy duty cranes, large boring mills, and other machines for fine surface finishing; also a 15-million-volt betatron for X-ray inspection of steel parts.

A wharf will be built on the Tennessee River frontage for barge transportation of reactor vessels weighing up to several hundred tons. The program is expected to be completed within a year.

The company has AEC approval to study and evaluate large reactors for central station power production, and small reactors for special applications. Study includes development of fuel fabrication processes.

General Dynamics Starts Study of Reactor Systems

General Dynamics Corp will make a reactor technology study which has been approved by the Atomic Energy Commission. The corporation estimates that $200,000 will be spent on the study for one year.

The company, constructor for the Nautilus, will investigate nuclear power reactors and specially designed components of reactor systems with a view to manufacturing. The firm will also explore various problems relating to peaceful application of power, such as decontamination services, utilization of by-product radiation, instrumentation, waste disposal, and materials and equipment to handle these problems.

B&W Awarded Contract for U of Mich Reactor

Babcock & Wilcox Co have been awarded a contract for the construction of a nuclear research reactor, the swimming pool type, by the Regents of the University of Michigan, at Ann Arbor.

Approval was also given to a total project budget of $1 million to cover construction and equipment costs. The Regents had previously approved naming the reactor the "Ford Nuclear Reactor" since the project is being undertaken with a grant of $1 million from the Ford Motor Co fund to the Michigan Memorial-Phoenix Project.

L & N Supplies Control

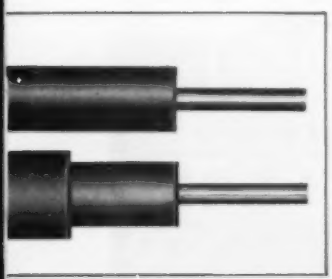
Leeds & Northrup Co will supply control instrumentation for the research nuclear reactor which is ex-

(*Continued on page* 59)

Anaconda Plastic Series Lighting Cable can be laid with tractor-mounted trench digger . . . with the trench immediately backfilled.

15 minutes later — same spot — photograph illustrates speed of installation. Anaconda cable gives maximum reliability for direct burial installation.

If you're going to bury it—be doubly sure with Anaconda quality



Three plastic types to choose from: polyethylene insulation plus Densheath (PVG) jacket; or all polyethylene or all Densheath.

Winter thaws and freeze-ups and summer rains can be forgotten when you use ANACONDA Plastic Series Lighting Cable. This cable—engineered for direct burial, duct or overhead installation—is unaffected by moisture, soil chemicals, sun and weather.

Anaconda Series Lighting Cable is available with either tough Densheath* (PVC) or Polyethylene compound, or both, for 3000 or 5000 volt applications. Plastic series cable has small O.D.'s and is easily handled.

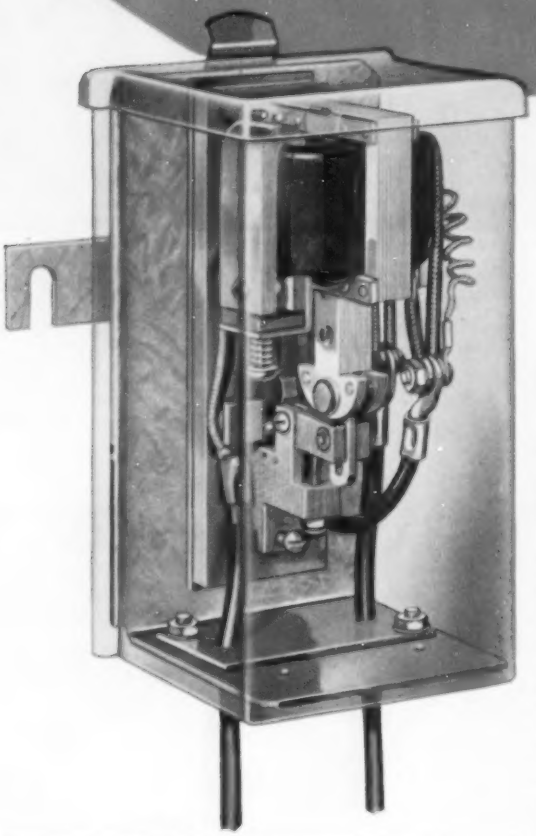
For full information, send for Anaconda's new Street Lighting Cable bulletin: DM-5345.

REMINDER: ANACONDA Plastic Pole and Bracket Cable delivers the same fine service in its job as ANACONDA Series Lighting Cable does in its. Buy *both* for assured dependability—from beginning to end. Just see the man from Anaconda. Anaconda Wire & Cable Company, 25 Broadway, New York 4, New York. 55005

*Reg. U. S. Pat. Off.

ANACONDA®
POWER CABLES

Take full advantage of banked secondaries...



Restore service Automatically with

KEARNEY

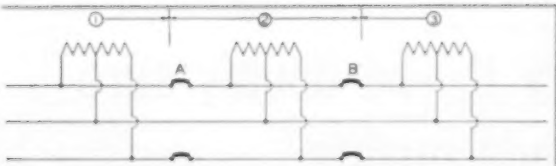
Secondary

CIRCUIT BREAKERS

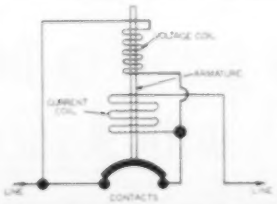
The fundamental advantage of banking transformers on a secondary is to distribute the load over several small units rather than force each transformer to handle the load in its immediate location.

Kearney Secondary Circuit Breakers make secondary banking practical and profitable. They are normally installed at points of minimum current interchange between transformers. When a fault occurs in one section, adjacent breakers open to protect unfaulted sections. When the fault clears itself, the breakers automatically reclose and restore service. On permanent faults, the breakers remain open, isolating the faulted section to prevent cascading of the outage to unaffected circuits.

Write today for descriptive information.



Portion of a typical banked secondary with sectionalizing breakers AA' and BB' installed



Internal wiring details of the breaker showing potential and current coils

282

For Better Construction...Safer Maintenance

JAMES R. KEARNEY CORPORATION ST. LOUIS, MO. GUELPH, ONT.

Specify **KEARNEY** *The Mark of Quality* **PRODUCTS**

JAMES R. KEARNEY CORPORATION • 4224-42 CLAYTON AVENUE, ST. LOUIS 10, MISSOURI • Canadian Plant: GUELPH, ONTARIO

L&N Control

(*Continued from page 56*)

pected to be installed at the Pennsylvania State University late this year.

This "swimming pool" or water-shielded type reactor is modeled after the Oak Ridge unit. It is being built by the University. Cost of all equipment and building will be approximately $300,000. Uranium is expected to be added in autumn.

L & N's packaged control will consist of cubicle-mounted Speedomax electronic recorders with cables, controls and drive mechanisms. Some recorders will show the power level and its rate of change while others will position the control rods and record the log count rate.

AMF Atomics Inc Formed to Handle AMF Activities

AMF Atomics Inc has been organized as a wholly-owned and newly-formed subsidiary of American Machine & Foundry Co, New York. The former will carry forward the company's activities in the atomic energy field and be responsible for AMF's atomic energy operations.

Appointments announced by Moorehead Patterson, AMF board chairman and president, are: Walter Bedell Smith, chairman of the board and president of AMF Atomics Inc; Arthur V. Peterson, vice president of operations of the corporation.

AMF is now constructing a nuclear research reactor for the Battelle Memorial Institute, Columbus, Ohio (EW, Mar. 7, 1955, p 172). The company also announced plans to establish in the New York area the first nuclear reactor to be owned and operated by private industry for research (EW, Mar. 21, 1955, p 205).

GE Reactor Prediction

Two nuclear reactors believed best suited for earliest and most effective competition with conventional fuel plants are:

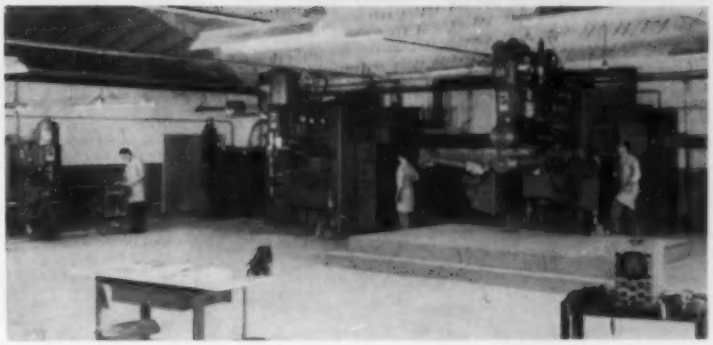
1. The tube-type, graphite-moderated, water-cooled reactor.

2. The tank-type, light-water-moderated boiling reactor.

This prediction was made recently by Francis K. McCune, vice president of General Electric Co.

In another prediction McCune said: "The integrated capability of nuclear fuel plants forecast . . . adds up to 40 million kw by 1975 and 120 million kw by 1980."

He said that total generating capacity in this country was 102 million kw in January, 1955. Forecasts predict "a rise to 375 million kw by 1975 and 514 million kw by 1980."



Sciaky Opens Welding Laboratory

Sciaky Bros. Inc of Chicago, Ill., recently opened a western research division in West Los Angeles, Calif. A modern 15,000 sq ft building houses a line of resistance welding machines including what are claimed to be the world's largest spot welder and seam welder. The spot welder delivers up to 38,000 lb pressure, 300,000 secondary amp, and is capable of joining two pieces of steel, up to 2 in. total thickness, or aluminum alloys up to 0.5 in. total thickness. Seam welder provides pressure up to 10,200 lb, secondary amp to 150,000, and has capacity to weld aluminum alloys up to 0.25 in. total thickness, and mild steel up to 0.5 in. total thickness. Power for the facilities is supplied from a 3,000 kva transformer bank.

Other facilities include special laboratories for metallurgical studies, metal cleaning and preparation equipment, testing machines and a machine shop. Research will be specialized in resistance welding and its related problems.

Manufacturing Briefs

Cornell-Dubilier Electric Corp of South Plainfield, N. J., has established a West Coast Division with a plant located in Venice, L. A., Calif. This is the first of several projected plants planned. Opening of the plant on April 20 marked the 45th anniversary of the company.

Okonite Co has consolidated its Pacific Coast sales office with its warehouse operations at a new location—701 Phelps St, San Francisco 24, Calif.

Rome Cable Corp of Rome, N. Y., recently added 90,000 sq ft of shipping and storage space to its facilities with the completion of a one-story brick and steel building. The new building is expected to permit realignment of manufacturing facilities toward broadening the product line.

Daystrom, Inc and Weston Electrical Instrument Corp agreed to a merger at a recent meeting of the directors of both companies, according to Thomas Roy Jones, president of Daystrom, and Earle R. Mellen, Weston's president. Under the terms of the agreement, Weston will be merged into Daystrom and the business and assets acquired will be transferred to a wholly-owned subsidiary of the latter under the old name.

Electro Mfg Corp of Chicago, Ill., has purchased Sloan Ashland Co, a sales organization, according to Victor Nemeroff, chairman of the board of Electro. Former company produces commercial and industrial lighting equipment. Sloan will operate as a division of Electro with Albert E. Sloan, former president, as executive vice-president in charge of sales. Leslie Schoenbrod is president of Electro and the new division.

BUSINESS OUTLOOK

Electrical World

MAY 9, 1955

The outlook, in brief: Business prospects still good for rest of 1955. High consumer spending and rising business capital spending are expected to offset the summer lull in autos and some slowing in home-building.

But even prosperity has problems.

This year, a new round of industrial wage increases will mean higher prices of electrical supplies and equipment.

—•—

Right now, 1955 looks like one of the big years for wage increases. There are two good reasons for that. One is the business boom. Rising prosperity means rising profits—and unions want their share. Prosperity also may weaken management's resistance to labor demands—because it doesn't want to take a strike when sales are going so well.

The other key force behind wage increases is the push for a guaranteed annual wage by the United Auto Workers. Whether they will get the GAW, or anything like it, still isn't clear. But they will certainly get something—probably something expensive. And that's all it takes to start a "round" of wage increases running through industry. No one wants to be left behind.

Higher industrial wages mean an upward push on prices of materials and equipment. In some cases, the effect is direct and immediate—a steel wage increase just about guarantees a price increase. That means higher costs for companies that make electrical equipment out of steel. Add the fact that their workers will be asking for more money, and its clear that the costs of producing equipment will go higher this year. The chances are that improvements in efficiency—productivity—won't be nearly enough to offset these higher costs in 1955.

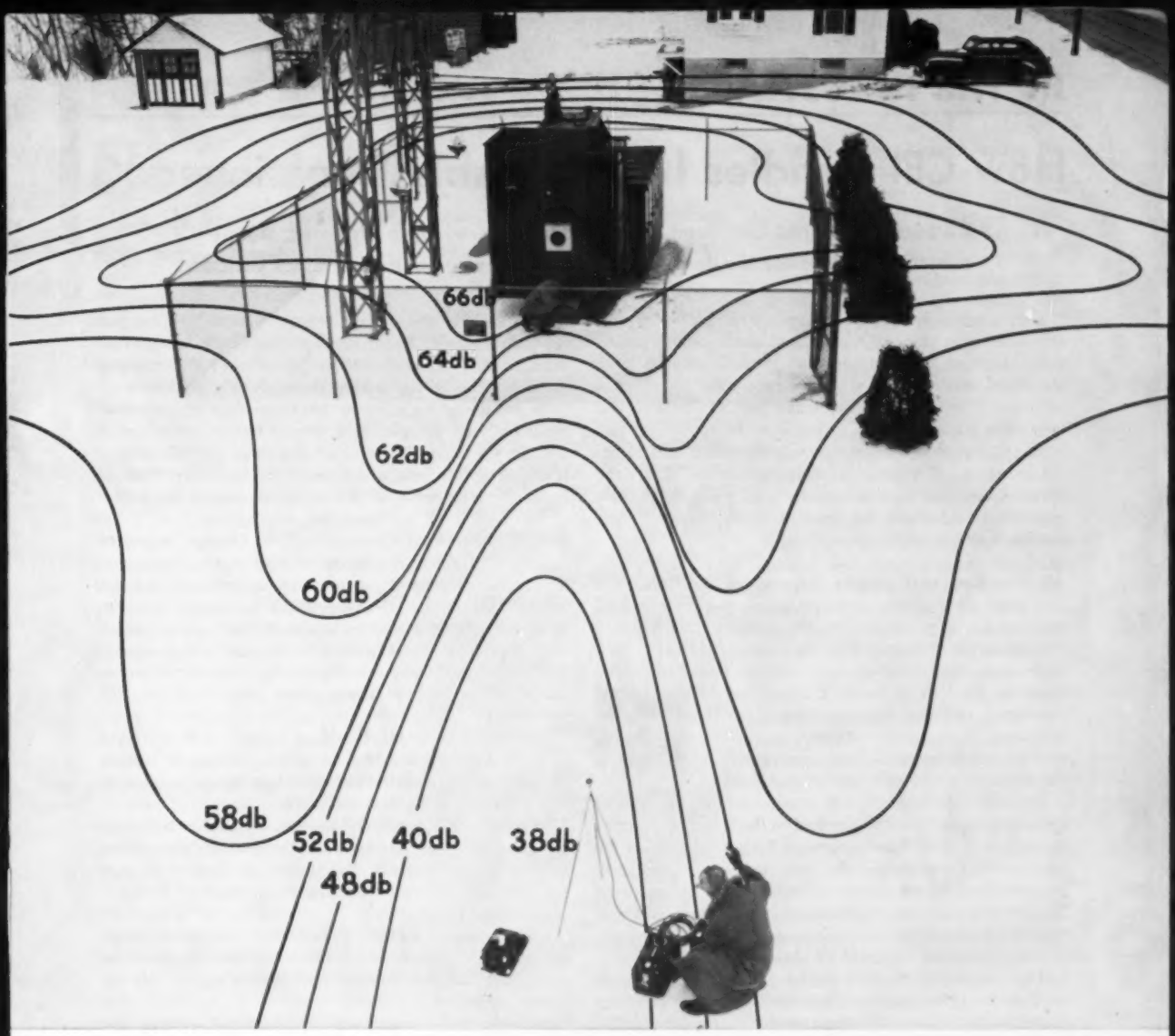
Does this mean return to serious wage and price inflation? The answer —for 1955—is, "probably not." **In the long run, of course, persistent rising costs mean higher prices along the line.** But this year, there are special forces operating to keep prices down.

—•—

Competition is the big force against higher prices. In industry after industry, the competitive struggle is tougher than it has been for years. And a manufacturer who's fighting for markets is not in a good position to pass on all his rising costs to his customers; the chances are he will pick up part of the tab himself. On the other hand, a rise in his costs may eliminate any chance that he'll cut his prices—as he might otherwise.

This year, too, **there's a chance that electrical equipment makers will be able to save something later in the year on copper.** So, while the trend in wages means some rise in material, construction and equipment costs, it won't bring an immediate return of galloping inflation.

Bright note for consumers: The price outlook is still very good. They will have a lot more money, on the average. And competition for the consumer market is so fierce that manufacturers, wholesalers and retailers will have to absorb practically all of higher costs this year. Aside from seasonal changes, it looks like a stable price year for the public at large—with plenty of good bargains for those who will shop carefully.

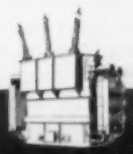


NOISE + NOISE = LESS NOISE

Sound cancellation—projecting a quiet zone through the complex sound field which surrounds a power transformer—may be an inexpensive solution to some transformer noise problems. Using loudspeakers and a relatively simple control circuit, G-E engineers have reduced transformer sound levels as much as 20 decibels within a 30° beam (noise energy reduced to 1/100 of its former value).

Here's how it works. A beam of sound with amplitude and major frequency characteristics identical to the transformer hum, ***but opposite in phase***, is aimed at the source of a complaint. These sound waves cancel each other... greatly reducing audible noise.

If you would like more detailed information on sound cancellation, ask your G-E Sales Engineer for a copy of a new technical bulletin, GET-2475. General Electric Co., Schenectady 5, New York. 421-30



Power Transformer NEWS

Progress Is Our Most Important Product

GENERAL ELECTRIC

How CEI Handles Its Charitable Donations

Corporate giving at Cleveland utility is administered by a five-man standing committee. Here are the details of how it is organized and determines policies

Every utility is faced each year with pleas for contributions from charitable, civic, and educational organizations. How to say "yes" or "no" to these requests is an individual matter handled in different ways by different utilities. It is such a delicate and personal matter that very little information on giving is to be found in print.

At the National Conference on Solicitations held earlier this year in Cleveland, a representative of Cleveland Electric Illuminating Co described in some detail how requests for donations are handled by that utility. These are highlights from the talk:

All Functions of Company Represented on Committee . . . Since 1945, CEI's corporate giving and memberships program has been assigned by the president to a five-man Committee on Subscriptions. This committee has a full-time permanent secretary to assemble information and reports needed in its work. Current membership on the committee includes representatives from these company functions: legal, public relations, marketing, distribution, and electrical operations and engineering. Chairman is the company's vice president-general counsel.

Recommendations of the committee for the annual subscriptions budget are submitted to the board of directors for approval. The Board-approved budget then serves the committee as a guide for the year. Items not specifically provided for in the approved budget may be approved for payment by the committee if the amount is under $1,000. Unbudgeted subscriptions for larger amounts require individual approval by the board.

The Committee on Subscriptions meets regularly once each month to study and discuss applications for company contributions. Generally these meetings run about 2½ hours but may run more or less, depending on the business at hand.

A complete and comprehensive agenda is prepared for each meeting. Background information is made available to each member well in advance of the monthly meeting. This serves to keep deferrals to a minimum.

In obtaining background information, the committee relies on such agencies as a central welfare organization and the Cleveland Chamber's Committee on Solicitations. It also obtains information from employees who participate in the various activities for which donations are asked.

Only Non-Sectarian Community-Wide Groups Supported . . . As CEI derives its funds from an entire community, its general practice is to support only projects of community-wide service. However, consideration is given to those projects sponsored by relatively small groups which may provide a direct service to the entire community. The corporate donations are generally confined to worthy causes within the 138 communities comprising the CEI service area.

One exception to this is annual support of the Harvard Business School which the committee believes is making an outstanding contribution to sound business thinking and training for business leadership.

In respect to national and local medical research drives, the committee has usually taken the position that except in very unusual cases it should lend its support to such activities only through federated giving plans of the community fund type.

CEI makes no contributions to the religious activities for which it is solicited. The committee follows the belief that "religion is a personal matter and is best left to the individual."

A comprehensive monthly report of its activities and actions is prepared by the committee each month for submission to top management in the company.

TECHNICAL NOTES

During disasters when residential electric service is off, automobile radios provide a means for customers receiving information about restoration progress. Sound trucks can also be used.

Carrier noise impulses with a definite repetition rate are usually attributable to rotating machinery and rectifiers close to the line and to arc furnaces connected to it.

Pipe coated with ½ in. of asphalt corrosion-protective covering has a leakage resistance to ground of about 3,000 ohms per 1,000 ft. Even at several thousand volts this constitutes fairly good insulation, but the risk should be averted by well-maintained terminal grounds.

Electric-spark metal cutting can be accomplished on outside surfaces at speeds exceeding the maximum grinding speed attainable by any other means in such hard materials as tungsten carbide.

Water used by industry approaches 100 billion gal per day. It may reach 210 billion by 1975.

Time-switched capacitors cannot recognize sudden changes in requirements, such as those caused by weather.

Uranium production rate is doubling every 18 months. Supply at $10 per lb will support large-scale power production.

Depreciation Orders Issued

Alabama and Maine commissions set accounting process to be followed under liberalized methods of calculating taxes

The Alabama Public Service Commission and the Maine Public Utilities Commission have issued orders with respect to accounting treatment of taxes deferred under the accelerated depreciation provision of Section 167 of the Internal Revenue Code of 1954.

Alabama PSC Order

On Feb. 28 the Alabama PSC ordered the following accounting rules:

"(1) To charge, during the period the accelerated depreciation of depreciable properties results in a deferral of federal income taxes, to "Provision for Deferred Federal Income Taxes" as a subaccount under Account 507, Taxes, and to credit to "Earned Surplus Restricted for Future Federal Income Taxes" as a separate account under Account 271, Earned Surplus, an amount or amounts in total for each year equal to the deferral of federal income taxes resulting from such accelerated depreciation.

"(2) To charge, during the period the accelerated depreciation of depreciable property results in increased federal income taxes, to "Earned Surplus Restricted for Future Federal Income Taxes" until such restricted surplus is exhausted, and to credit to "Current Federal Income Taxes deferred in Prior Years" a subaccount under Account 507, Taxes, an amount or amounts in total for each year equal to the increase in federal income taxes resulting from such lower federal tax depreciation deductions.

"Jurisdiction of this cause", the order said, "is hereby retained for such further order or orders as the commission finds just and reasonable in the premises."

Maine PUC Order

The Maine PUC, on Jan. 12, issued instructions to Bangor Hydro-Electric Co with respect to the handling of liberalized tax depreciation on the company's books.

The PUC said, in part, "The adoption of a method of accelerated depreciation for income tax purposes simply serves to defer federal income tax payments. With a constant tax rate, the total income taxes over the lives of the property will be the same whether the tax deduction for depreciation is taken under the Sum of the Years-Digits Method, the Declining Balance Method or the Straight-Line Method as has been heretofore used by the company with respect to all depreciable property," the commission order said.

The PUC, after distinguishing between rapid amortization of costs of defense facilities under Certificates of Necessity issued by the Defense Production Administration (Section 168) and Section 167 of the Internal Revenue Code of 1954 dealing with accelerated depreciation in the calculation of the federal income tax liability, stated that "The two sections are somewhat similar in result however, in that Congress intended (as expressed in the Senate and House Committee Reports on the Internal Revenue Code of 1954) that funds would be made available for expansion and replacement of facilities through the temporary deferment of federal income taxes."

40% Write-off Possible

The commission continued "As distinguished from Section 168 (of concern in U.-2068), Section 167 could result in the write-off of more than 40% of the cost of an asset in the first quarter of its service life or as much as two-thirds of the cost in the first half of the service life. Assuming the same tax rates, the use of the accelerated methods in Section 167 would result in the payment of less taxes in the early years and more taxes in the later years of the service life of the asset."

Of particular importance to utilities was the following statement made by the PUC when it said, "To permit or to require that accelerated depreciation be a part of normal expenses would result in higher customer charges during the early years of service life and lower charges during the later years which would result in unjust discrimination against present customers. Conversely, to require that income tax deferments be credited to expense in early years would be offset by higher income tax expenses during the later service years, an unjust discrimination against future customers," the order pointed out.

The Maine commission concluded in its order that:

"(1) During the periods when the annual allowances for depreciation for federal income tax purposes under any of the said accelerated depreciation methods are more than what would be the allowance for normal income tax depreciation of such properties under the Straight Line Method, such resulting tax reduction shall be credited to a sub-account under Account 259, 'Other Reserves', titled 'Reserve for Deferred Federal Income Taxes' with a concurrent charge to a sub-account under Account 401B, 'Taxes—Electric' title 'Provision for Deferred Federal Income Taxes.'"

"(2) During the period when the allowances for depreciation for federal income tax purposes under the accelerated depreciation methods are less than what would be the allowance for normal tax depreciation of such properties under the straight line method, the company shall charge the resulting difference to the aforementioned 'Reserve for Deferred Federal Income Taxes' with a concurrent credit to the 'Provision for Deferred Federal Income Taxes.'

"(3) As a part of its annual report to the commission, the company shall set forth all transactions related to the 'Reserve for Deferred Federal Income Taxes.'

"(4) The company shall continue to provide in its books of account for depreciation of its property in the normal manner as provided in General Instruction 8 of the Uniform System of Accounts for Electric Utilities. Such provisions will not be changed by reason of the adoption of any method of accelerated depreciation for federal income tax purposes."

(More Finance on next page)

PS of Colorado Ups Common Dividend to 45¢

Public Service Co of Colorado has boosted its common stock dividend rate from 40¢ quarterly to 45¢ effective with payments Aug. 1 to stock of record July 13.

Pres John E. Loiseau announced the company is planning to issue 303,010 additional shares of common stock. He said 275,464 shares would be offered to stockholders about June 1 at one new share for each 10 shares held.

The other 27,546 shares will be offered at the same price to employees of the company and subsidiaries under an employee installment purchase plan. Stock price will be set later.

FINANCIAL BRIEFS

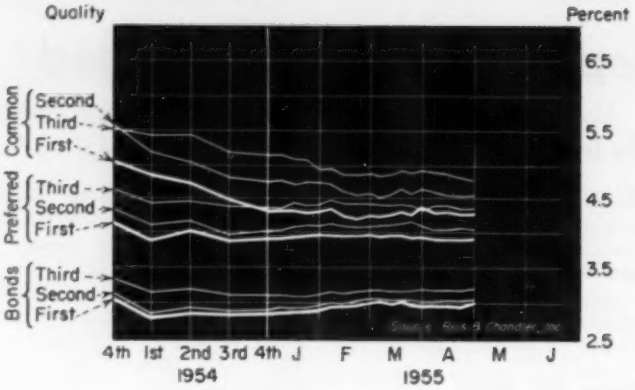
Dividend Increases . . . Arkansas-Missouri Power Co will pay June 15 a common quarterly dividend of 31¢ a share as compared with 28¢ in prior quarters . . . Central Illinois Public Service Co will pay June 10 a quarterly common dividend of 35¢ a share versus 30¢ in previous quarters . . . Missouri Utilities Co will pay June 1 a common quarterly dividend of 34¢ a share as compared with 31¢ previously.

Idaho Power Co is asking Federal Power Commission approval to sell 15,000 shares of $100 par cumulative preferred stock privately to an underwriter . . . Tacoma, Wash., Department of Public Utilities will offer $15 million revenue bonds in June.

Long Island Lighting Co has placed 50,000 shares of 4.35% cumulative, $100 par preferred stock with institutions.

Lincoln Service Corp, Frontier, Wyo., has received Public Service Commission approval to construct and operate an electric transmission and distribution system to serve some 90 townships in Lincoln and Sublette counties . . . **Pacific Power & Light Co** is planning to discontinue its steam heating service in downtown Casper, Wyo. . . . **Consumers Power Co** has sold its gas system in Manistee, Mich., to Raymond S. Weidenfeller and Mahlon R. Stewart of Sault Ste. Marie, Mich. Sale involves 1,600 consumers.

Today's Utility Yields—(%)



QUALITY	BONDS			PREFERRED STOCKS			COMMON STOCKS		
	1st	2nd	3rd	1st	2nd	3rd	1st	2nd	3rd
April 28	3.00	3.05	3.19	3.92	4.04	4.37	4.29	4.52	4.83
April 21	2.99	3.03	3.19	3.91	4.04	4.37	4.28	4.52	4.85

Utility Earnings

COMPANY	PERIOD MONTHS	ENDED	NET INCOME 1954	NET INCOME 1953	EARNINGS PER COMMON SHARE 1954	EARNINGS PER COMMON SHARE 1953
Arkansas-Missouri Power	12	Dec.	$969,449	$722,302	$1.76	$1.36
Arkansas Power & Light	12	Dec.	8,507,485	6,293,598	.....	.....
Central Maine Power	12	Dec.	5,950,454	4,554,210	1.89	1.45
Citizens Utilities and subsidiaries	12	Dec.	985,886	907,117	1.06	0.97
Housatonic Public Service	12	Dec.	586,530	483,631	1.58	1.47
Portland General Electric	12	Dec.	4,346,351	3,821,464	1.45	1.27
Public Service of Oklahoma	12	Dec.	5,964,861	5,562,608	.....	.....
Tampa Electric	12	Dec.	2,977,025	2,554,060	1.37	1.18

Note—All figures shown above have been audited.

Utility Financing

COMPANY AND DESCRIPTION	AMOUNT OF OFFERING (000)	OFFERING PRICE	YIELD TO PUBLIC
SCHEDULE FOR MAY			
BONDS AND DEBENTURES			BID DATE
Southern California Edison—Conv. debs due 1980 (to be offered common and preferred holders on the basis of one right for each share held on May 17 with 20 rights entitling holder to subscribe for $100 of debs)	$40,951	$100.00	.....
Georgia Power—1st mtg due 1985	12,000	.....	May 10
Jersey Central Power & Light—1st mtg due 1985	20,000	.....	May 10
Ohio Edison—1st mtg due 1985	30,000	.....	May 17
Alabama Power—1st mtg due 1985	15,000	.....	May 24
Brockton Edison—1st mtg due 1985	6,000	.....	May 25
Potomac Electric Power—1st mtg	.....	.....	.....
PREFERRED STOCK			
Public Service of Oklahoma—100,000 sh $100 par	$10,000	.....	May 17
COMMON STOCK			
Florida Power Corp—232,577 sh (to be offered commonholders on 1-for-10 basis, record May 11 to expire May 31)	.....	.....	.....
Iowa Public Service—270,220 sh (to be offered commonholders on 1-for-10 basis, record May 11 to expire June 1)	.....	.....	.....
Potomac Electric Power—311,650 sh (to be offered commonholders on 1-for10 basis, record May 23)	.....	.....	.....
Kansas City Power & Light—245,000 sh (to be offered commonholders on 1-for-10 basis)	.....	.....	.....

Choose from a wide range of standard Alcoa® Aluminum Bus Conductors for light, corrosion-resistant, economical bus systems

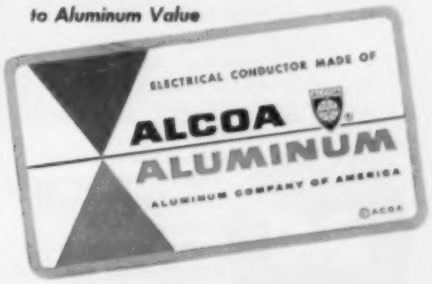
Whatever your installation or bus design problem is, there's an Alcoa Aluminum Bus Conductor so right for the job it's almost custom fabricated. Alcoa has developed shapes, alloys and tempers to meet the mechanical and electrical requirements for any bus conductor application.

Let us help you design your job in aluminum to get the most out of the many available types of Alcoa Aluminum Bus Conductors. Ask your nearest Alcoa sales office for assistance or address Aluminum Company of America, 2306-E Alcoa Building, Mellon Square, Pittsburgh 19, Pennsylvania.

Tensile properties of Alcoa Aluminum Bus Bars are checked on this Baldwin-Southwark tension-testing machine, periodically calibrated to assure precision.

A precision potentiometer records the voltage drop on test sections of Alcoa Aluminum Bus Bar in the Massena, New York, laboratories, world's largest facility for aluminum conductor research.

Your Guide to Aluminum Value



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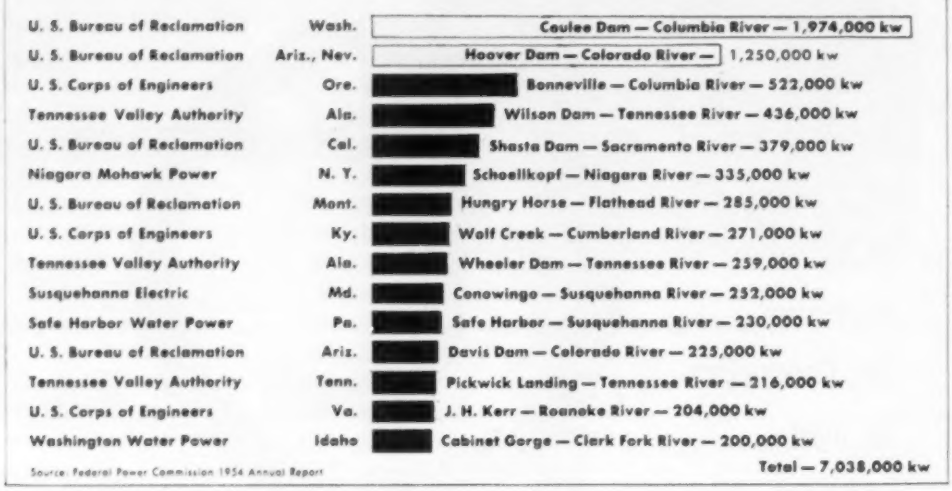
STATISTICS

15 Biggest Dam Projects House Over 7,000,000 Kw Capacity


U. S. Bureau of Reclamation
Wash.
Coulee Dam — Columbia River — 1,974,000 kw
U. S. Bureau of Reclamation
Ariz., Nev.
Hoover Dam — Colorado River — 1,250,000 kw
U. S. Corps of Engineers
Ore.
Bonneville — Columbia River — 522,000 kw
Tennessee Valley Authority
Ala.
Wilson Dam — Tennessee River — 436,000 kw
U. S. Bureau of Reclamation
Cal.
Shasta Dam — Sacramento River — 379,000 kw
Niagara Mohawk Power
N. Y.
Schoellkopf — Niagara River — 335,000 kw
U. S. Bureau of Reclamation
Mont.
Hungry Horse — Flathead River — 285,000 kw
U. S. Corps of Engineers
Ky.
Wolf Creek — Cumberland River — 271,000 kw
Tennessee Valley Authority
Ala.
Wheeler Dam — Tennessee River — 259,000 kw
Susquehanna Electric
Md.
Conowingo — Susquehanna River — 252,000 kw
Safe Harbor Water Power
Pa.
Safe Harbor — Susquehanna River — 230,000 kw
U. S. Bureau of Reclamation
Ariz.
Davis Dam — Colorado River — 225,000 kw
Tennessee Valley Authority
Tenn.
Pickwick Landing — Tennessee River — 216,000 kw
U. S. Corps of Engineers
Va.
J. H. Kerr — Roanoke River — 204,000 kw
Washington Water Power
Idaho
Cabinet Gorge — Clark Fork River — 200,000 kw
Total — 7,038,000 kw

Source: Federal Power Commission 1954 Annual Report

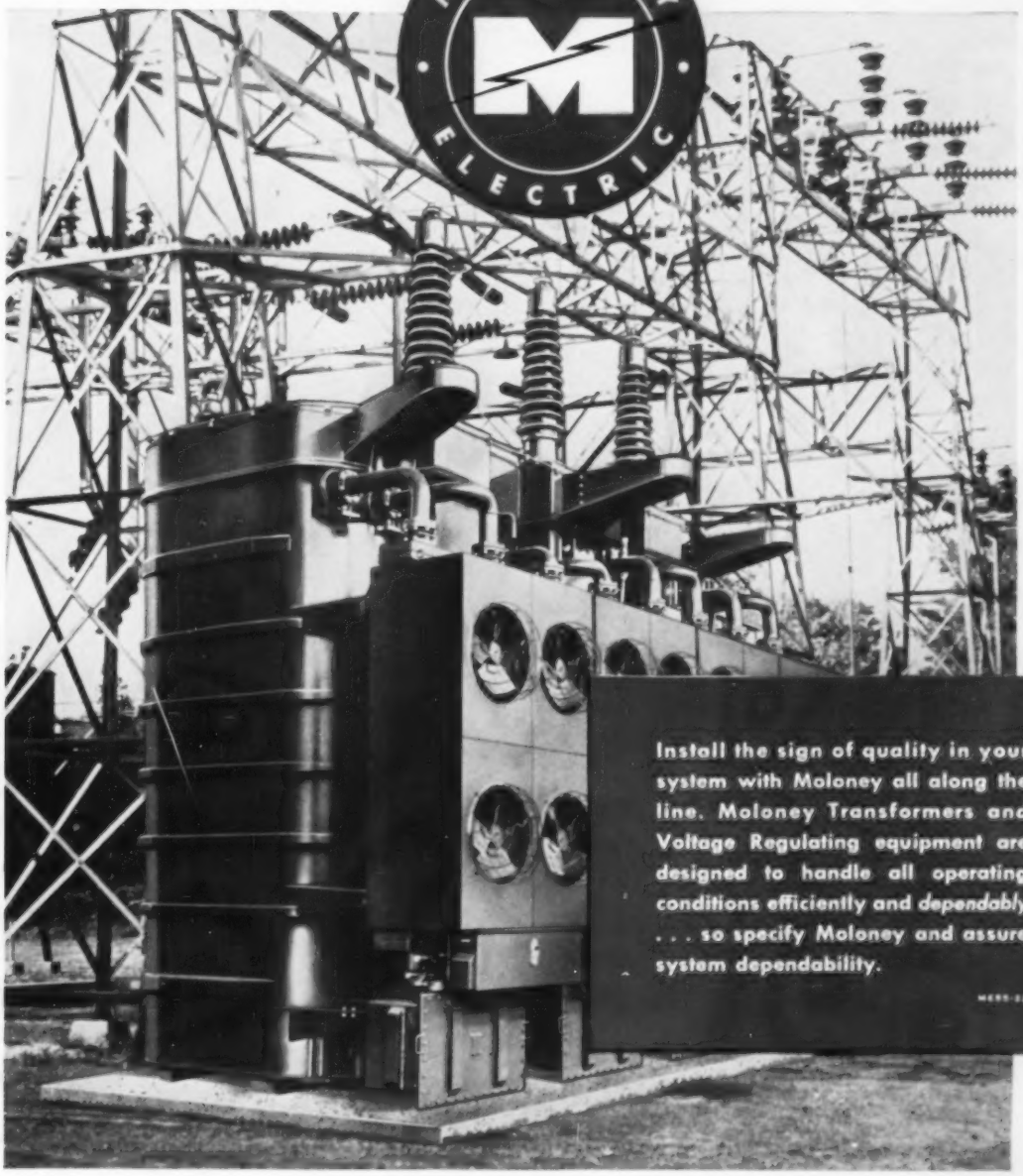
Power Statistics . . .

		Latest Month	Preceding Month	Year Ago	Annual Change%
Capacity	Mar.	104.93	103.74	92.99	12.8
Peak—Class I Systems (million kw)	Feb.	83.9	84.1	74.9	12.0
Estimated Dec. '55 Peak (million kw)	Feb.	96.4	95.7	96.2	0.2
Production—billion kwhr	Feb.	40.23	43.96	35.21	14.3
hydro		8.57	9.43	8.56	0.1
fuel		31.66	34.53	26.65	18.8
Sales—billion kwhr	Feb.	38.99	39.26	34.08	14.4
residential		11.57	11.70	10.36	11.7
commercial		6.20	6.23	5.72	8.3
industrial—includes sales to AEC		19.11	19.15	15.99	19.5
other		2.11	2.18	2.01	5.1
Fuel Consumption	Feb.				
coal—million tons		11.09	12.02	9.07	22.3
oil—million barrels		7.43	8.91	5.70	30.4
gas—billion cu ft		63.6	65.13	75.74	−16.0
Net Income Class A & B Co's—$ million	Jan.	112.60	109.05	111.44	1.0
Residential Customers—millions	12 mos.	43.26	43.14	42.04	2.9
revenue per kwhr	ended	2.69¢	2.69¢	2.73¢	−1.5
avg. kwhr per customer	Jan.	2,564	2,549	2,365	8.4
avg. annual bill		$68.97	$68.57	$64.56	6.8

Business Statistics . . .

Indexes: 1947–49=100					
FRB Industrial Production	Mar.	137	135	126	8.7
ENR Construction Cost	Mar.	135.4	135.1	128.7	5.2
BLS Cost-of-Living	Mar.	114.3	114.3	114.8	−0.4
NEMA Sales	Feb.				
insulation materials		137	132	120	14.2
electric appliances		118	118	98	20.4
household refrigerators		94	96	91	3.4
Wholesale prices	Mar.				
motors and generators		121.0	121.0	124.2	−2.6
transformers and regulators		127.8	127.8	128.1	−0.2
switchgear and fuses		135.4	135.4	135.1	0.2
GNP—annual rate—$ billion	1st Qtr.	$369.0	$362.0	$355.8	3.7

ASSURE SYSTEM DEPENDABILITY!



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Power Transformers • Distribution Transformers • Step Voltage Regulators • Regulating Transformers • Load Tap Changing Transformers • Load Center Transformers • Unit Substations • Network Transformers • Constant Current Transformers • Capacitors • Transformers for Electronics

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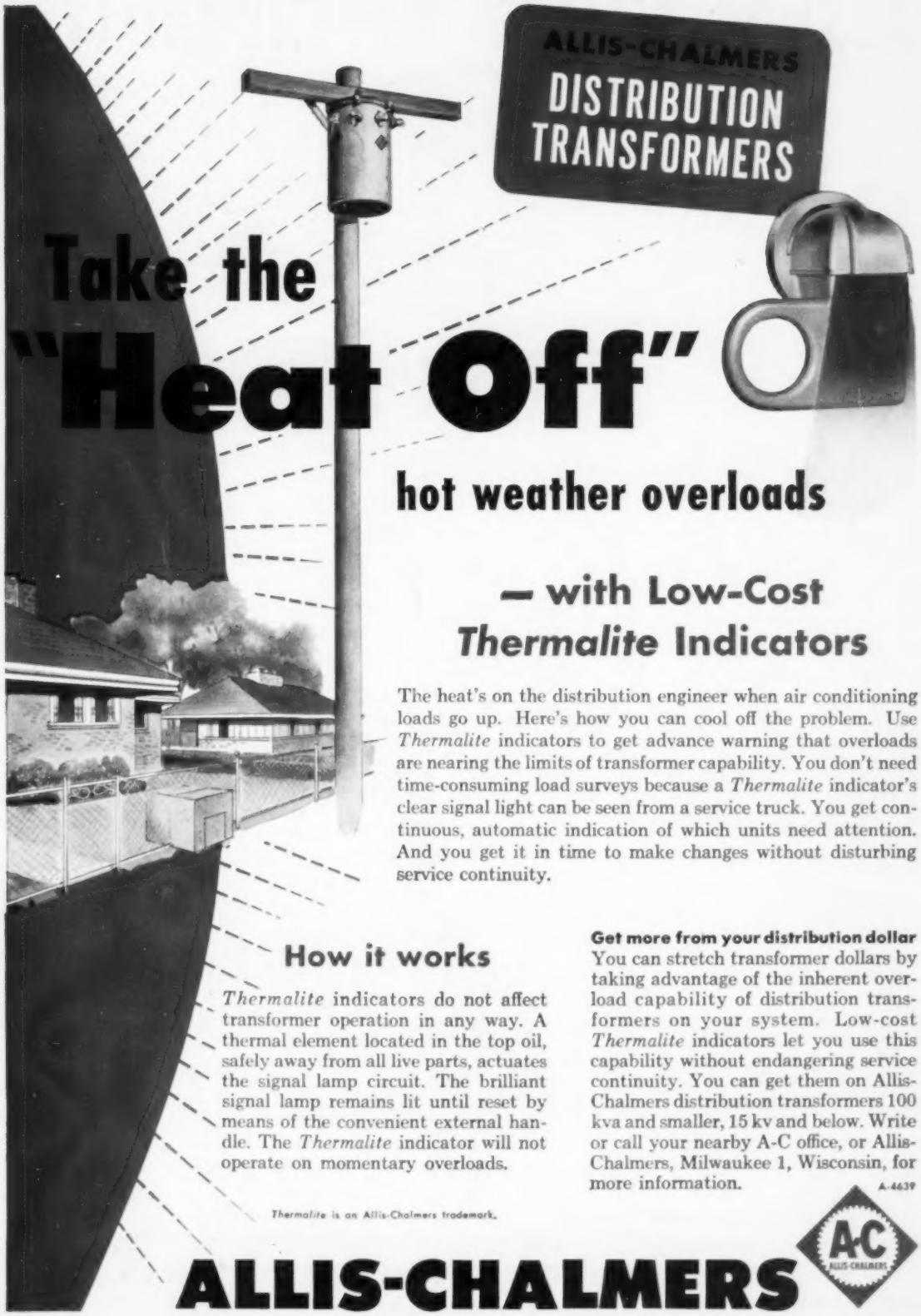
ALLIS-CHALMERS
DISTRIBUTION
TRANSFORMERS
Take the
"Heat Off"
hot weather overloads
— with Low-Cost
Thermalite Indicators
The heat's on the distribution engineer when air conditioning loads go up. Here's how you can cool off the problem. Use Thermalite indicators to get advance warning that overloads are nearing the limits of transformer capability. You don't need time-consuming load surveys because a Thermalite indicator's clear signal light can be seen from a service truck. You get continuous, automatic indication of which units need attention. And you get it in time to make changes without disturbing service continuity.
How it works
Thermalite indicators do not affect transformer operation in any way. A thermal element located in the top oil, safely away from all live parts, actuates the signal lamp circuit. The brilliant signal lamp remains lit until reset by means of the convenient external handle. The Thermalite indicator will not operate on momentary overloads.
Get more from your distribution dollar
You can stretch transformer dollars by taking advantage of the inherent overload capability of distribution transformers on your system. Low-cost Thermalite indicators let you use this capability without endangering service continuity. You can get them on Allis-Chalmers distribution transformers 100 kva and smaller, 15 kv and below. Write or call your nearby A-C office, or Allis-Chalmers, Milwaukee 1, Wisconsin, for more information.
A-4639
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